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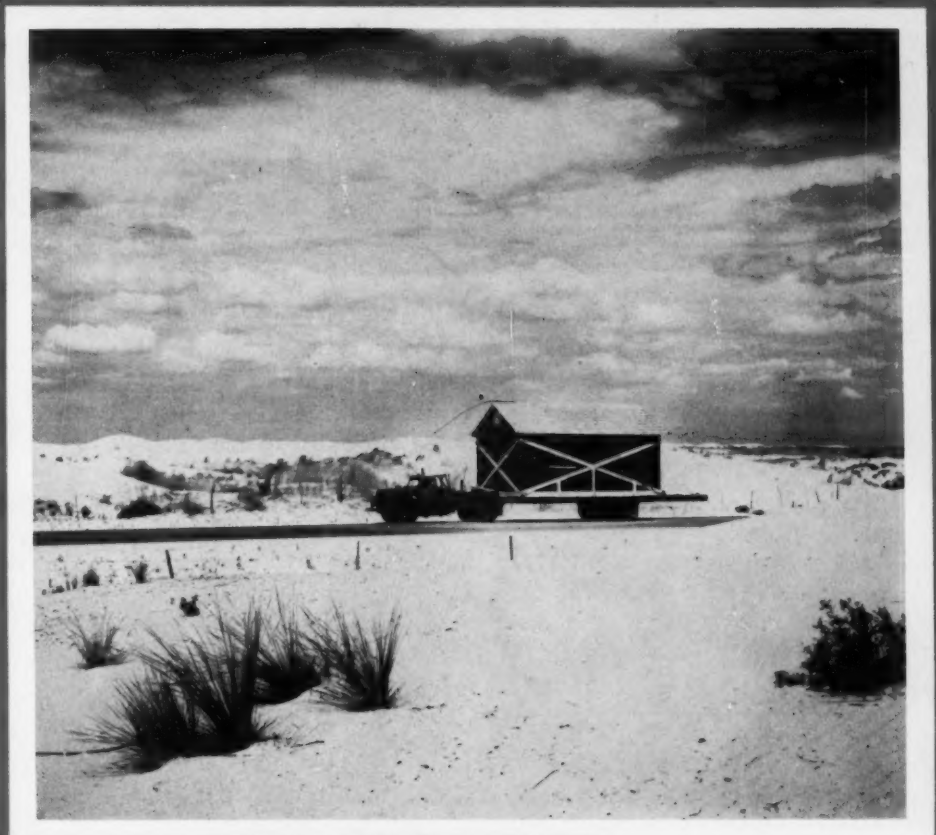
Telephony

THE JOURNAL OF THE
TELEPHONE INDUSTRY
SINCE 1901



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Guaranteed Circulation This Issue
13,252 of Which 12,710 Is Paid

DIAL C. O. ON THE MOVE

Southwestern Bell's Anson (Tex.) central office moved 250 miles to serve Pyote Air Force Base. Photo shows it crossing dunes east of Kermit, Tex., during the 24-hour trip. See page 32.

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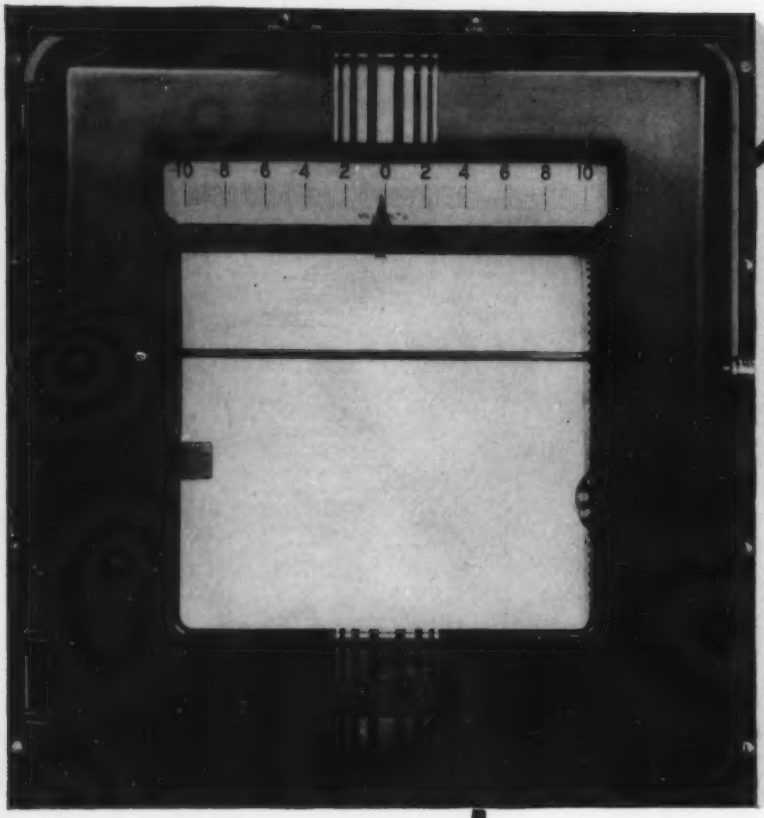
100% AUTOMATIC ASSURES *that all conductors in every length of Whitney Blake Telecable® leave the factory free from . . .*



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- GROUNDS
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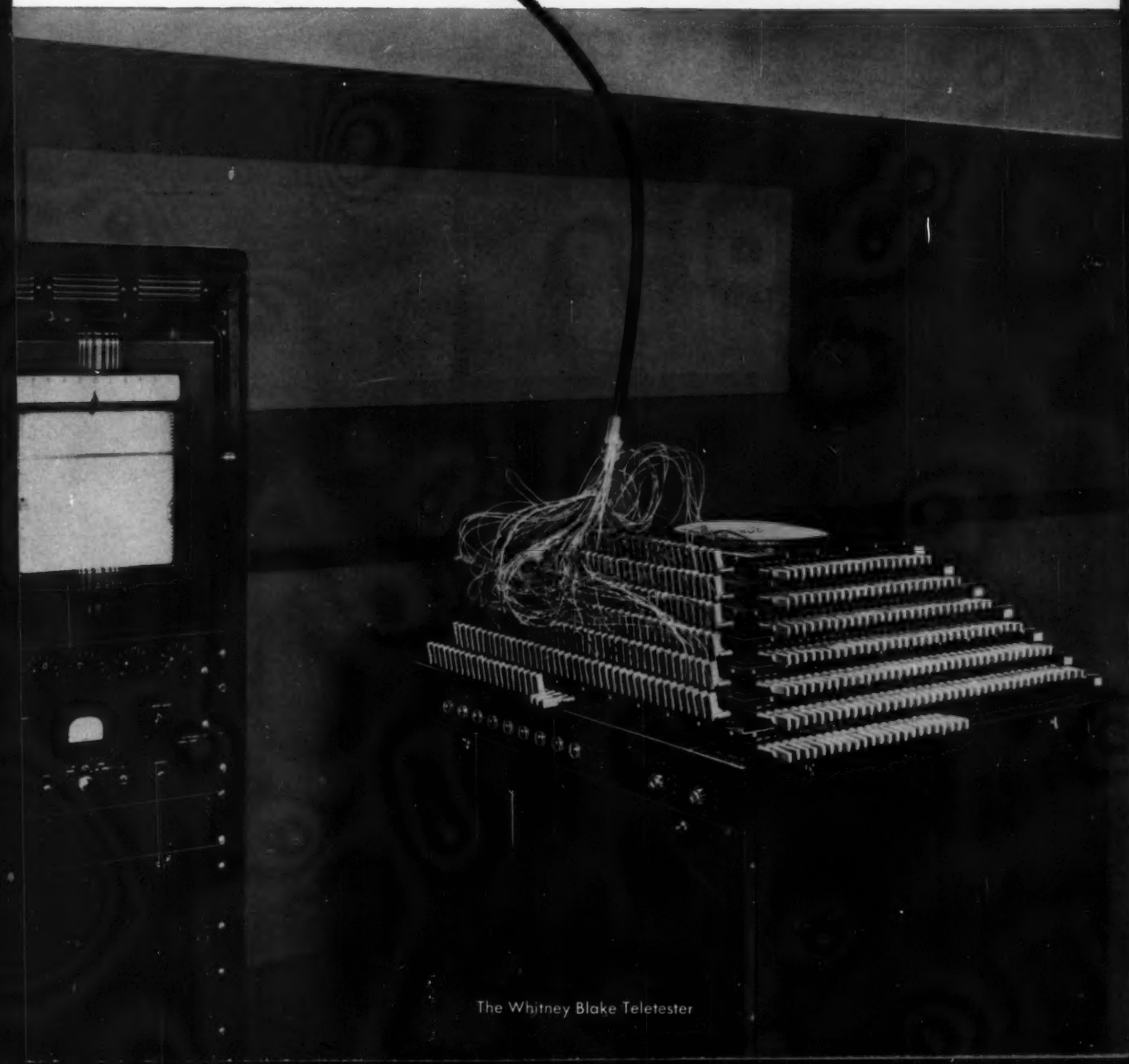

The Whitney Blake Teletester

FLASHES AND PLUGS

RE-SCENTMENT. A frustrated Canadian pharmacist recently complained to would-be customers, on the outside of his store, that he couldn't open the store. The reason—a company of five skunks had invaded the drugstore and taken possession of the display area. Their attack had been so over-powering that both owner, personnel, and customers were driven back.

Scenting further moves on the part of the skunks, the desperate owner telephoned the humane society, who in turn, referred him to the fire department. The firemen, however, knew when a problem was "off limits" for them to tackle, and promptly referred the druggist back to the society.

Finally, as the animal quintet seemed bent on some referrals of their own, the owner fled the store.

•

CAN'T WIN DEPARTMENT. There was the man from Newark, N. J., who with his wife, was on a vacation trip. They arrived in Washington, and he remembered a married college chum who lived there. A telephone call brought the visitors a hearty invitation to "come right out."

This they did, having first changed from casual attire into their best clothes. They were met at the gate by their hosts, both dressed in walking shorts and shirts open at the collar.

The visitors were a bit embarrassed, left early, and having promised to return the next day, felt sure they knew what to do. Of course, they wore their walking shorts, only to be greeted at the gate again, by their hosts who were this time wearing THEIR best!

The New Jersey callers did not try their luck on a third visit, but this time, headed for home.

•

"SACKING" THE SACK TIME. The Toronto *Financial Post* suggests that one's sleepless hours can be made productive with an Electronic Secretary, like the one in the new United States medical center.

It's so easy to telephone the office at any time and dictate letters or reports—while ideas are on the mind, the *Post* states. A stenographer then transcribes the material the next day.

Sounds as though a lot of wasted time can be eliminated, and it could be much more satisfying than counting the patterns in the wall paper. So far, there's no report on whether this insomnia remedy is cheaper than sleeping pills, concludes the *Post*.

•

SPLIT PERSONALITY. Engineering Professor: "Didn't you have a brother in this class last year?"

Student: "No, sir, it was I. I'm taking this course over again."

Engineering Professor: "Extraordinary resemblance, though, extraordinary."

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Dept. of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

October 10, 1959

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THE *New* LORAIN BAT-TAP

another FIRST from LORAIN!

the only device delivering 24 volts DC

with full efficiency, full battery protection

NO POWER LOSS

Voltage reduction by CEMF cells or resistors wastes half the power used. Bat-Tap prevents this loss.

PROTECTS BATTERY

Voltage reduction by tapping the battery causes uneven charging and discharging of cells, unless an extra 24-volt charger is used on the cells involved. Bat-Tap protects your battery, needs no extra equipment.

NO MOVING PARTS

The Lorain Bat-Tap uses a new transistorized inductor arrangement combined with silicon diodes. 48-volt DC is first converted to AC, then to 24-volt DC in a simple, foolproof circuit.

SAFE ON OVERLOADS

Bat-Tap easily withstands intermittent overloads up to 30%.

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Efficiencies are as high as 80 to 89% from 25% of rating to 30% overload. Efficiency at full load is 87.5%.

RATINGS

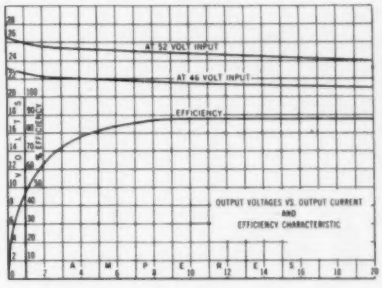
Model QB15A

Input: 44-52 volts, 0.5 ampere no load, 8 amperes 400 watts full load.

Output: 21-27 volts at full load of 15 amperes, 350 watts.

Regulation: 1.5 volt drop from 1 ampere to 15-ampere load.

Filtered input and output (output filtered to 2 millivolts).



EASY INSTALLATION

Bat-Tap requires only simple external connection of input and output leads. Fits 19″ relay rack. Height 6¾″. Depth 9¾″. Weight 32 lbs.

ZERO MAINTENANCE

The Lorain Bat-Tap never needs attention. There is nothing to wear out or need adjustment. Install it and you can forget about your 24-volt power supply.

POWER EQUIPMENT FOR COMMUNICATIONS AND INDUSTRY

our equipment is sold through leading telephone distributors

FLOTROL SUB-CYCLE

LORAIN *Products Corporation*

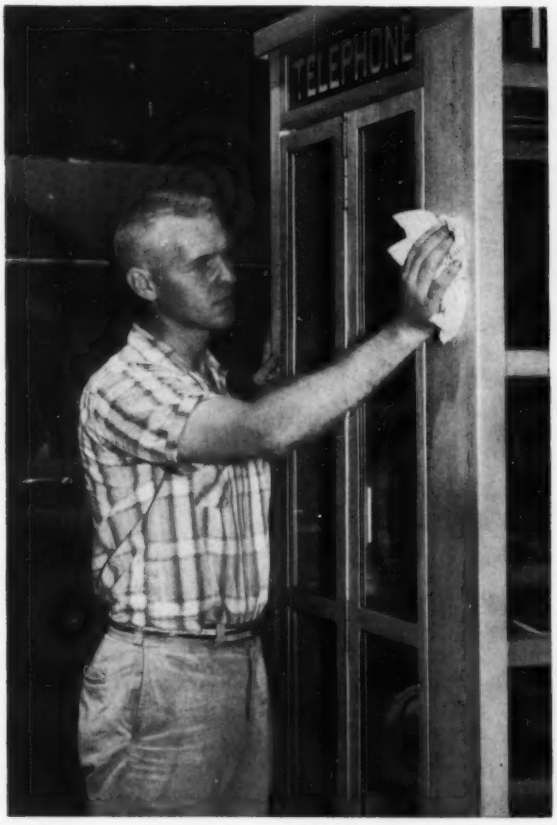
1122 F Street Lorain, Ohio Phone: ATlantic 8-9191

Added revenue from constant traffic at the roomy Alcoa booth in Oquawka, Illinois, pleases E. R. Watson, general commercial manager, Western Illinois Telephone Company.

"THIS ALCOA BOOTH PAID ITS WAY FROM THE START,"

reports E. R. Watson, Western Illinois Telephone Company

"Two years ago, we set up this Alcoa Aluminum outdoor booth in Oquawka, Illinois—a small fishing and resort town on the Mississippi—and it began paying for itself right from the day it was installed," declared E. R. Watson, general commercial manager for the Western Illinois Telephone Company.



"Maintenance is never a problem with Alcoa booths. A wipe with a damp cloth restores the aluminum to its original sheen, and the high-strength, solid Alcoa construction helps curb vandalism," says Mr. Watson.

"In peak vacation seasons, revenue from this one booth runs as high as $140 a month. People certainly seem to appreciate the convenience of outdoor booths and are attracted to the well-lighted and clean-looking Alcoa models. Like all 19 Alcoa booths on our system, installation was easy and maintenance is no problem. Routine sweeping and occasional washing are all that is ever necessary."

Telephone companies everywhere are discovering that Alcoa outdoor booths offer a sure way to gain additional revenue and customer goodwill. Their pleasing appearance, superior fluorescent lighting and larger interiors make them inviting to use. And the corrosion-resistant properties of high-strength, heat-treated aluminum give an unusually solid construction that assures profitable, long life investment.

FREE ALCOA GOODWILL KITS. Here's the big EXTRA that comes with every Alcoa booth. These free kits contain newspaper mats, publicity releases, envelope stuffers, radio and TV commercials—everything you need to tell your customers about the added convenience of booths of Alcoa® Aluminum.

FOR MORE INFORMATION ON ALCOA BOOTHS, write for brochure. And ask your jobber how Alcoa booths can increase your revenue and build customer goodwill. Aluminum Company of America, 1720-K Alcoa Building, Pittsburgh 19, Pa.

For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and the Emmy Award winning "Alcoa Theatre" alternate Mondays, NBC-TV

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

YOUR GUIDE TO THE BEST IN ALUMINUM VALUE

Pre-engineered, pre-packaged, complete ..."ready to grow" in your territory

Lenkurt mobile telephone systems open up a new source of revenue *with only a small initial investment*. Base station equipment can be provided that meets your immediate needs only, yet can be expanded easily and economically as your service grows. And, of course, you buy subscriber units only as you need them.

Important economies are made possible because Lenkurt Mobiltel systems are engineered *by* telephone people *for* telephone people . . : "from dashboard to switchboard." No additional engineering source is needed to provide a completely integrated system.

Lenkurt Mobiltel *Manual* is operator controlled, and is fully compatible with Bell System service. Mobiltel *Automatic*, for local area service, is the economical system for dial exchanges where operators are not available. "Compatible Channel" feature provides fully-roving service into manual mobile service areas.

Complete Mobiltel "packages" can be furnished in common-carrier frequencies and various power outputs, to meet specific requirements of large *or* small communities. Available on an "Engineer, Furnish and Install" basis, if you wish. For specifics, ask your Automatic Electric representative for Circular 901-P4, or fill in and mail coupon today.

Lenkurt has it now...

* MANUAL

mobiltel

* AUTOMATIC

ALL YOUR
COMMUNICATIONS NEEDS
FROM ONE
DEPENDABLE SOURCE

Automatic Electric Sales Corporation,
Northlake, Illinois
Attention: Mr. T. B. Collins, Director, Carrier & Radio Sales

Please send literature on:

- ☐ Lenkurt "Mobiltel" Mobile Telephone Equipment
- ☐ Lenkurt Carrier
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- ☐ Lenkurt "Datatel" Telegraph Equipment
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Address_____

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AUTOMATIC ELECTRIC

Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

NEW EXPERIMENT IN TELEPHONY

It could speed up "dialing." Bell Laboratories people created it—and now it's being tested.

The telephone you see above embodies an important new concept. It "dials" by means of push buttons—promises more convenient telephoning. Bell System engineers are currently testing it for public reaction. Bell Telephone Laboratories developed it.

The Laboratories' invention of the transistor makes it possible. For the transistor permits a new kind of calling signal generator, mounted within the instrument.

To insure ease of operation, psychologists studied human reactions to various finger pressures and sizes and arrangements of buttons. All factors affecting speed and accuracy were thoroughly evaluated. Electrical and mechanical engineers brought together the human and physical factors, created a practical piece of apparatus. Industrial designers worked out the functional shape.

The new instrument sends a calling signal quite different from that of your present telephone. This poses a problem. Complex automatic switching must be changed to handle the new signals as well as the old ones. Switching engineers must devise ways to make this change in *thousands* of central offices—economically.

Most of the challenges have been met. Final judgment on this new concept depends on the outcome of field tests. Meanwhile, Bell Laboratories continues in its task of originating and developing devices to improve your Bell System telephone service.

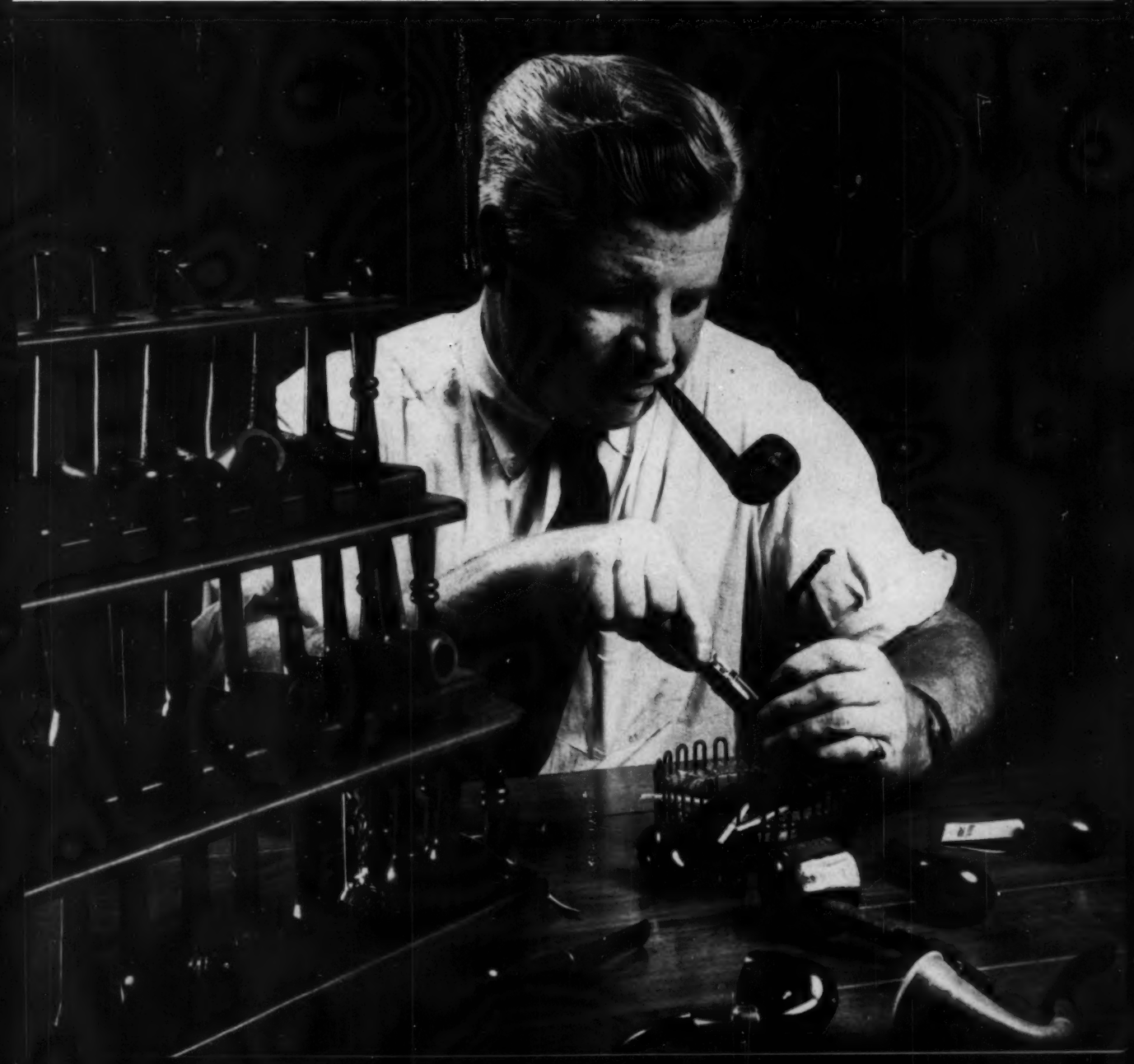
BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT

"Quality *and* quantity is a combination that's essential to a true pipe collector", says this connoisseur. It's equally desirable for industrial wood users, too. That's why so many of them consistently specify AMCRECO pressure treated products. Take quality. Service records of installations going back several decades show that AMCRECO pressure treatment provides the longest lasting, most dependable wood protection. Quantity? We maintain sizable stocks of treated material at 13 strategically located plants. This assures you delivery of well seasoned treated poles, posts, ties and other timber – whatever the emergency or size of your order.

AMERICAN CREOSOTING CORPORATION AMCRECO PRESSURE TREATED WOOD PRODUCTS Louisville 2, Kentucky

Subsidiary of Union Bag-Camp Paper Corporation



Better in all ways...

BETTER TO LOOK AT! Choice of 15 attractive colors to match all decors, whether for home, school or business: red, yellow, green, blue, beige, grey, ivory, turquoise, rose pink, aqua blue, light beige, light grey, white, brown, black. Available in standard desk or the new, popular wall models.

BETTER TO LISTEN TO! Surpasses all previous instrument performances! Completely engineered to set a new standard of excellence for independent telephony. Varistors provide proper level of voice transmission; incorporate acoustic peak suppression.

BETTER TO TALK OVER! Speech quality is improved too: the shorter handset design extends the frequency bandwidth, sets a new high in transmitting and receiving performance. The transmitter is closer to user's mouth, gives a better signal-to-noise ratio.

the Kellogg K-500

BETTER INSIDE! Designed for top performance, using highest quality components throughout. Receiver, transmitter, ringer are new in principle, design and performance; the network is a compact, sealed housing. The single-lobed dial cam provides more uniform pulses; the new number plate makes for faster, surer dialing.

Kellogg's K-500 series is your best answer to assure subscriber satisfaction and long, reliable service. Ask your local Kellogg representative to explain the new monthly shipment plan for K-500s: it guarantees you a steady supply of these wanted telephones —at lowest unit cost.

KELLOGG
CHICAGO, ILLINOIS
Communications Division of ITT

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue, Chicago 38, Illinois
Communications Division of International Telephone and Telegraph Corporation.

Regional Offices and Warehouses:

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KANSAS: 7th & Sunshine Road, Kansas City 15, Kansas, MAyfair 1-4418.
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Save money, time and trouble..

Off-season, basal application of Esteron® 245 O.S. is the safe, efficient, economical way to get lasting control of troublesome vegetation along right-of-ways. This rapid kill, chemical vegetation control helps utilities keep a clear line to customers . . . keeps the way clear for inspectors and repair men.

Applying a direct spray of Esteron 245 O.S. to the base area of vegetation gives prolonged control of brush, upland hardwoods, and so-called problem species, including ash. This basal method of application is especially desirable along distribution lines adjacent to public roads and highways. It eliminates the sometimes objectionable and unsightly

spray during the off-season with

...Esteron 245 O.S.

"browning" caused by foliage sprays.

Control of brush and weeds during an off-season is particularly safe. There are no growing crops to damage. And, application costs are lower when your spraying contractor isn't rushed. You are assured of better vegetation control in a shorter time . . . and at a saving.

Whenever . . . wherever you're faced with unwanted vegetation, you can depend on Dow brush and weed killers. For detailed information on low cost Esteron 245 O.S. or any of the other Dow vegetation control chemicals, write to: THE DOW CHEMICAL COMPANY, Industrial Section, Agricultural Chemicals Sales Dept. 204FD10-10, Midland, Michigan.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

Rural Telephone Lines

TALK BETTER LAST LONGER

with low-cost

Copperweld® O-Eighty-Thirty

TELEPHONE LINE WIRE

The superior voice transmission of O-Eighty-Thirty Telephone Line Wire makes friends and builds good will every time a subscriber picks up his phone. And this low-cost line wire continues to provide the same excellent talking qualities even after many years of service. There's no building-up of noise level and weakening of signals due to rust, because O-Eighty-Thirty is completely non-rusting.

You save money, too. The initial cost is practically the same as ordinary wire. And its extra high strength permits economical long-span construction on both voice and carrier circuits. O-Eighty-Thirty is easy to install, due to its light weight—which also saves on shipping and handling costs.

In short, you can provide high-grade service at low cost for your subscriber loops and secondary toll lines by stringing O-Eighty-Thirty Line Wire. And you'll be building for long, trouble-free life.

Write us today for prices, sag data and staking tables.

COPPERWELD STEEL COMPANY

WIRE AND CABLE DIVISION *Glassport, Pa.*

For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

SOLD BY LEADING DISTRIBUTORS

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR
AND EDITOR, PUBLIC UTILITIES FORTNIGHTLY

New federal law removes some uncertainty over U. S. Supreme Court's ruling upholding state tax on out-of-state transient business. FPC disallows utilities' advertising expense as regulatory expense. FCC Ex-Chairman McConnaughey cleared in Boston TV station award case.

OPERATING utility companies probably will not be as much concerned about a law passed by the recent Congress, and signed by the President, as some of the manufacturers of equipment and supplies. But, it is an interesting fact that Congress did try to ease some of the state tax restrictions imposed on business concerns occasionally operating in more than one state. Readers may recall that a U. S. Supreme Court decision last year threw some business concerns into a state of confusion by a closely divided opinion of the court upholding the right of a state to tax business obtained by traveling salesmen for enterprises which actually did not otherwise operate in that state.

The law recently passed should at least remove some of the uncertainty which followed in the wake of the high court's decision, upholding state taxation of transient business done by out-of-state companies. Utility companies may run into this problem as the result of merchandising sales or servicing of appliance installations in border-line territory, but operating telephone companies rarely engage in such out-of-state sales operations.

Under the new law, states may still levy a tax on the income of an outside company that stems from activity within the taxing state, only if that company has an office, a "salable" inventory, a warehouse, or other place of business in that state. About the only tax-free sales left to an outside company would be the dispatch of salesmen to solicit orders in the state and come out again. The company's employes could not set up any kind of office, and could not complete any sales in the state.

So, it will be seen that the new law does little more than make interstate commerce safe for strictly traveling salesmen. There is still a good bit of uncertainty and complaint about other forms of transient businesses, such as temporary warehousing, relaying of shipments, and other variations of delivery and distribution of orders outside the home state of the company making the sale. So, there will probably be continued agitation in the next Congress to expand the scope of the intrastate tax exemption on transient business.

What Price Tax Deductions?

Telephone companies as well as other public utilities have a bread-and-butter interest in the ruling made by the Internal Revenue Commissioner over a year ago to the effect that the expense of advertising, designed to support or defeat or otherwise influence legislation, pending or proposed, is not deductible from the company's taxable income as a business expense. The basis for this ruling, which goes back to a phrase in the Internal Revenue Act, even before it was amended in 1954, is that the so-called "lobbying" expenditures are not tax deductible.

This situation has been previously discussed in this department. Readers may remember that it really has a double impact on a regulated utility company, because, if an expense is not tax deductible, it raises the question of whether it may be properly charged to operating expenses before determining the return allowance for rate-making purposes. Thus, the public utility company stands to be bitten twice in the same place if it incurs an advertising expense of this kind; once by way of a taxation disallowance, and again by way of a regulatory disallowance.

In the case of electric utility companies, which have contributed considerable sums to national advertising programs (notably, the Electric Companies Advertising Program carried widely in the mass media magazines), this double bite of both tax and regulatory disallowance is already a fact. That is because the electric companies are more immediately involved at the present time in a legislative or counter-legislative program to fight back the encroachment of government ownership in the electric power business.

And, so it was that, after the Commissioner of Internal Revenue had specifically ruled that contributions of a number of electric companies to the so-called ECAP program were not tax deductible, the Federal Power Commission (through an examiner's opinion) made a similar ruling from the standpoint of regulatory expense disallowance. This does not mean, of course, that public utility companies cannot contribute to such advertising. But, it does mean that the expense may have to be borne by the stockholders rather than the ratepayers. In other words, the expense would have to

be paid out of earnings *after* taxes, and *after* the return allowance, rather than automatically being deducted before taxes and return are computed.

Almost any public utility company, or any other line of business for that matter, could be hit by this line of reasoning. Those who oppose such rulings (and who have asked for congressional legislation to reverse them) can make out a good case that lobbying and propaganda to defend a business from being injured by legislation or government competition is just as important to a company's welfare as the money laid out for burglary protection, accident insurance, and other expense items which are not questioned at all.

And, it is not much consolation to tell these companies that they can still go on advertising along these lines by simply charging the tab to the stockholders *after* taxes and *after* return. Some consideration of the other side of the picture emphasizes the injustice of such rulings. The question was raised recently by Rep. Charles O. Porter (D., Ore.). This congressman has been objecting to corporations taking space to advertise their views on current questions, such as in the area of labor disputes. He criticizes this as an undue expenditure of funds adding to the cost of the product which the ultimate consumer must pay.

The syndicated columnist, George E. Sokolsky says that this view would reduce the management of American business to second-class citizenship, with limited rights. When the steel companies advertise their side of the present strike, the cry is raised that they are running up the price of steel by unnecessary expense. But, when the United Steelworkers of America take full page advertisements in newspapers all over the country to set forth the point of view of the management of the union (in the recent steel strike), there is no objection from anyone as to the right of the union to spend its own money in this way. There certainly is no tax question involved because unions do not pay income taxes anyway. If such expenditures got out of hand, conceivably the members might object to such use of their dues. But, this is very unlikely to happen.

The question raised by Representative Porter touches on a very important distinction between the managerial discretion of a public utility company and the management of an unregulated enterprise, such as the steel companies. Unregulated business does not have to bother to ask anybody's permission to advertise out of the earnings of the business. If the advertisements happen to be in the "lobbying" category, the Internal Revenue Commissioner may deny a deduction for tax purposes. (As was actually done in the U. S. Supreme Court decision early this year throwing out the expense of a liquor company's publicity to defeat local prohibition laws.) But, at least, there is no public service commission, or federal regulatory commission, to tell the steel companies they cannot charge such advertising expenditures to operations—for the simple reason that unregulated companies are entitled to all the return they can earn, without any limitation of allowance by a regulatory authority.

The distinction between unregulated business and a public utility in this area goes a step further. Unregulated business is often of such a nature that it can pick up and get out of the community, or get out of the state, or even get out of the country, if it does not like the way it is being treated at these respective levels. A public utility company has no such choice. These industries have billions of dollars worth of investment, literally staked to the ground, and they have to make the best of whatever treatment is handed to them.

Sokolsky, for example, quotes a very interesting letter written to him by the head of the American Forest Products Corp., Walter S. Johnson. He comments on the fact that domestic business is losing foreign markets under pressure of increasing domestic operating expenses (including payroll and taxes). And, it was advertising along these lines that has aroused the unfavorable comment about unregulated business stating its own case. Mr. Johnson's letter, in part, states:

". . . the United States, unlike other countries, is faced with growing taxes, but I do find the statement that each year taxes take more of industries' dollars and certainly there is nothing spurious about that. The (Union Oil Co.) advertisement shows we are pricing ourselves out of world markets and if we do not stay competitive it is the same thing as pricing ourselves out of

(Continued on page 55)

Recent Quotations of Independent Telephone Stocks

	10/1/59 BID	10/1/59 ASKED	8/28/59 BID	8/28/59 ASKED
Anglo-Canadian Telephone Co.	33	33¾	36	37
California Interstate Telephone Co.	14¾	15¼	15¼	15¾
California Pacific Utilities Co.	34¼	34¾	34½	35
California Water & Telephone Co.	25⅝	26	26	26½
Carolina Telephone & Telegraph Co.	168 Bid		165 Bid	
Central Telephone Co.	26¾	27½	25½	26
Chenago & Unadilla Telephone Corp.	27 Bid		27 Bid	
Cincinnati & Suburban Bell Telephone Co.	91½	92½	92¾	93¾
Commonwealth Telephone Co.	18¾		18¼	19
Florida Telephone Corp. Class A	24¾	30½	30½	31½
General Telephone Corp. Common	69⅜	Last Sale	72½	Last Sale
Hawaiian Telephone Co.	21	22	22¾	23¾
Indiana Telephone Corp.	19	21	19½	21
Inter-County Telephone & Telegraph Co.	54	57	57½	59½
Inter-Mountain Telephone Co.	15½	16	15¾	16¼
Lincoln Telephone & Telegraph Co.	59 Bid		60 Bid	
Middle States Telephone Co. of Illinois	22¼	23¼	22½	23
North Carolina Telephone Co.	1⅜	1½	1½	1¾
Northern Ohio Telephone Co.	44	46	46	48
Peoples Telephone Co.	95 Bid		88 Bid	
Rochester Telephone Corp.	26	Last Sale	28¾	Last Sale
Southern Nevada Telephone Co.	21	22	22½	23½
Southern New England Telephone Co.	43	43½	45	45½
Southwestern States Telephone Co.	24¼	24¾	23¾	24¼
Telephone Service Co. of Ohio Class A	115	122	114	117
Tidewater Telephone Co.	25	27	25	27
United Utilities, Inc.	30	30½	33¼	34
West Coast Telephone Co.	24¾	25¼	25⅝	26⅛
Western Light & Telephone Co., Inc.	39½	40½	42½	43¼

(Quotations supplied by Merrill Lynch, Pierce, Fenner & Smith)

Corrections in Albert's "Amplitude Modulation In Carrier Systems"

It wasn't "our day" when we made up Part 2 of Arthur L. Albert's "Amplitude Modulation in Carrier Systems" — TELEPHONY, Sept. 12. The drawings for Fig. 4 and Fig. 6 were transposed, Fig. 4 drawing appearing mistakenly on page 27, and the real Fig. 6 appearing on page 26.

The reason it wasn't "our day" is that in our Oct 3 issue, page 18, we ran a correction of another error in Part 2: near the top of the middle column on page 27 appeared the statement, "Measurements with a wave analyzer gave 1.2 volts." The amount should be 0.12 volt.

Application of

Negative Impedance Repeaters

By ROBERT P. DIMMER*

SINCE THEIR introduction into the telephone plant some four years ago, the Automatic Electric type AT-2 and AT-3 negative impedance repeaters have found wide usage. This type of repeater is both simple and low in initial cost; and when properly installed, its operating and maintenance cost is practically negligible.

In most cases these repeaters were installed without difficulty; in some instances, however, reports were received that units were singing or were set very close to this unstable condition. In almost all instances of instability, the use of the wrong type of network, or attempted use of too high a gain step was found to be the primary cause of trouble.

Many users used the rule of thumb that a series repeater will provide gain equal to 50 per cent of the loss of the line in *all cases*, and were disturbed when terminal repeaters were sometimes unstable with this design technique. Others attempted to provide a VNL + 2 circuit from a series repeater when such a transmission loss under some conditions could never be attained from a single negative impedance repeater.

The purpose of this article is to help those users by showing the application of standard methods of design in a simplified form for calculating the maximum safe gain that these units are capable of supplying without getting into singing or near sing difficulties.

Automatic Electric Co. AT-2 repeater.

No attempt is made to cover all the phases of circuits nor to go into all the fine details of transmission theory in order to squeeze the last bit of gain from these repeaters, but the author believes the methods presented will place the repeaters into stable operation with gains near the maximum attainable by any other method.

In this design, no attempt will be made to use a shunt repeater on a facility with any amount of nonloaded cable. Also, it is assumed that loaded cable on either side of an intermediate repeater is of the same type. Where the loading is dissimilar, more advanced transmission techniques should be considered.

Strapping charts or component tables should be used wherever possible, because they provide the smoothest over-all gain over the voice band for the particular facility. If the over-all facility consists of several sections of mixed gauges and/or loading types, one should attempt to use the table of the facility nearest to the repeater.

Examples are given at the end of this article showing how to handle the various calculations leading up to obtaining the maximum recommended gain that can be realized from these repeaters.

General Discussion

If circuits using AT repeaters are designed in accordance with the methods described, they should meet the requirements for being passive and excessive talker echo should not occur.

If an excessive peak occurs using this technique of design, it is usually caused

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by using a gain step which is too high for the *particular* facility, or because the facility is in trouble. In these cases it is well to study the design of the facility before blame is put on the repeater.

Facilities with missing or defective load coils, wrong ratio repeating coils, etc. can cause excessive peaks and valleys to the response of a circuit with a negative impedance repeater. If a peak is excessive, the repeater will probably become unstable at the frequency of this peak.

It is desirable when designing circuits using these repeaters, particularly the series AT-2 alone, that the repeater output level at either circuit terminal will not exceed + 8.0 db relative to a 0 db transmitting level. Caution should be exercised when using test or signaling tones to avoid limiting action, distortion, and possible interference with other services (crosstalk).

In locations where these repeaters are subjected to a very high ambient temperature (above 105 degrees F), and where the outside plant remains at a low temperature, it is well to reduce the maximum gain obtainable by approximately 5 per cent.

In locations where the facility temperature also rises at the same rate as the repeater, automatic compensation usually occurs, and no special attention need be given to this consideration.

The general design method for the series repeater is based on the fact that the most critical condition from a stability standpoint is the idle condition, and therefore in determining the maximum insertion gain that can be obtained, the terminal office return loss is taken as 0 db. On circuits with idle line terminations, it is usually possible to obtain a slightly higher gain, particularly when a combination repeater is in use.

If idle line terminations are available, it is important that they remain on the circuit at all times *even during switching* until termination occurs. If this does not occur, the repeater will sing during unterminated conditions with possible crosstalk problems.

Required Gain

The gain required in a particular circuit is determined by the transmission objective and other general engineering considerations. This gain required is one of the design factors which will determine the type of repeater to be used. Gain, as computed, is the *maximum* obtainable gain using a series AT-2 alone or a combination AT-23 repeater in a particular circuit condition.

DB Transmission Loss per Mile @ 1000 C.P.S.

Gauge	Capacity	Non-Loaded (Effective)	Loaded (H-88)
16	.062	.79	.18
16	.072	.85	.20
19	.062	1.12	.35
19	.072	1.20	.38
19	.080	1.27	.40
19	.090	1.35	.42
22	.072	1.71	.74
22	.080	1.80	.78
22	.090	1.91	.82
22	.095	1.96	.84
24	.080	2.28	1.23
24	.085	2.35	1.27
24	.090	2.42	1.30
26	.079	2.87	1.95
26	.085	2.98	1.96

Table II

Repeater Location

The most favorable location for an AT-2 repeater is in the middle third of a circuit when it contains six load points or more. For a shorter circuit, a terminal location gives a smoother gain versus frequency characteristic. For nonloaded cable, the middle third location is always the best, regardless of length of circuit.

When a circuit is made up of unlike facilities, the best location is at the junction of the facilities. This is especially true on special service lines when loaded and nonloaded facilities occur on the same circuit.

The most favorable results will be obtained when an AT-23 is used in an intermediate location on loaded facilities of uniform type with accurate load spacing, and no major irregularities. In most instances, repeaters are used in terminal applications because of lack of intermediate offices. In these applications the usual terminal repeater penalties occur.

In some instances, particularly in Via Net Loss (VNL) design, it may be necessary to use a second repeater on the same facility. Some additional gain is possible if the two repeater points are separated by at least 7 to 9 db. In this case, the greatest gain can be obtained if the two repeater points are between 4 and 5 db from either end of the circuit.

End Section Treatment

The maximum usable gain of a terminal repeater will be obtained if

Combining Return Losses

Energy Summation Basis

Rule 1. To combine any two return losses:

(1) Subtract the smaller from the larger number to obtain the difference *D*.

(2) In the table read the value of *F* corresponding to this difference.

(3) Subtract this value *F* from the smaller of the original return losses to obtain the combination of the return losses in db.

Rule 2. To combine more than two return losses, combine the two highest values by Rule 1, then combine the resultant return loss with the highest remaining return loss. Continue this process until all of the return losses have been included.

D	*F*	*D*	*F*	*D*	*F*
0	3.0	2.5	1.9	6.1	0.9
0.1	2.9	2.7	1.8	6.7	0.8
0.3	2.8	3.0	1.7	7.2	0.7
0.5	2.7	3.4	1.6	7.9	0.6
0.8	2.6	3.7	1.5	8.7	0.5
1.0	2.5	4.0	1.4	9.6	0.4
1.2	2.4	4.4	1.3	10.8	0.3
1.4	2.3	4.8	1.2	12.3	0.2
1.7	2.2	5.2	1.1	14.5	0.1
1.9	2.1	5.6	1.0	19.4	0
2.2	2.0	6.1		Infinity	
2.5					

Table I

the loading end section of the cable falls between the 0.4 and 0.6 section inclusive. For end sections smaller than 0.4, the line should be built-out with capacitors contained within the AT-2 for this purpose. The end section in this case should be built-out to the 0.5 section as an objective.

The repeater may be used for larger end sections, but a penalty in the gain must be taken. This penalty is 0.2 db for each 0.1 section above 0.6 section.

To correct a large end section in order to eliminate this gain penalty requires:

(1) Build-out line to a full 1.0 end section;

(2) Add a full weight load coil;

(3) Build-out to the 0.4 to 0.6 end section using the capacitors within the AT-2 repeater.

It is not advisable to permit operation on end sections above 0.8 section because of frequency distortion effects.

The end section adjacent to an intermediate repeater should fall within the 0.4 to 0.6 section. If one side is appreciably higher, that side can be treated as suggested in the previous paragraph. In all cases, the sum of the two resulting end sections should equal at least 1.0 section. If both end sections require building out, it may be necessary to use additional capacitors than those contained within the AT-2 repeater.

Maximum Usable Gain (AT-2)

The maximum usable repeater gain of an AT-2 from the standpoint of singing and instability is determined from the return losses of the fixed line section on both sides of the repeater. In all cases, the return loss at each end of a circuit is taken as 0 db. In terminal repeater application, the return loss on the office side of the repeater is therefore 0 db.

Fig. 1 gives the maximum usable gain as a result of the return losses of the two fixed lines. In this case the lines, in the case of an intermediate repeater, are similar, loaded or non-loaded. To determine the return loss of a facility, use *Table II* and follow the simplified procedure in the examples at the end of this article.

With nonloaded facilities on both sides, *Fig. 1* may be used to determine the maximum gain obtainable, using the return loss as twice the effective loss of the nonloaded sides of the repeater.

In cases where the repeater has loaded cable on one side, and nonloaded cable on the other, *Fig. 2* can be used to determine the maximum usable gain using the return loss of the loaded, and the effective loss x 2 of the nonloaded.

Table II on page 20 of this article gives the effective loss of common cables.

Maximum Usable Gain (AT-23)

The maximum usable repeater gain of an AT-23 is determined from the return losses of the fixed line sections on both sides of the repeater in the same way as for the AT-2 above. This repeater is not open circuit stable; consequently, it is not feasible to open

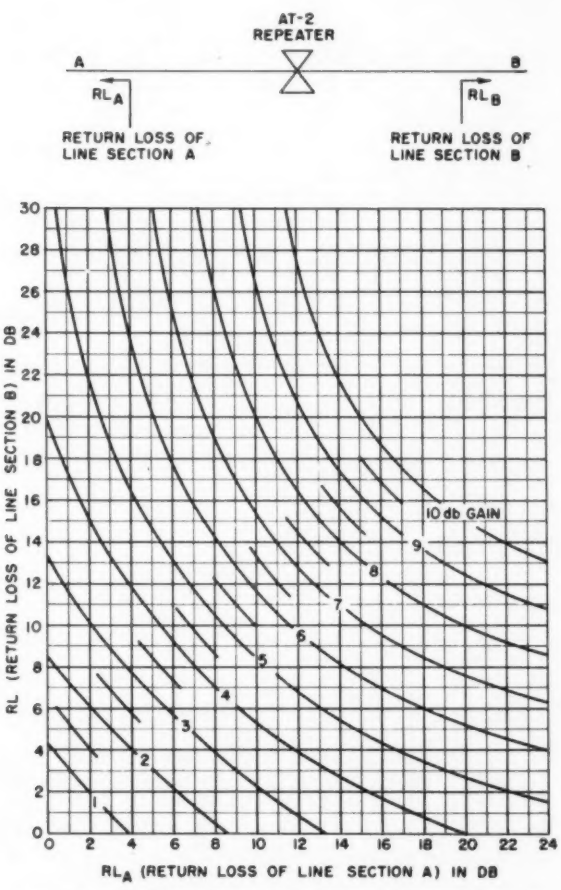
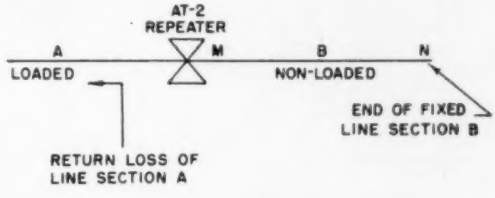


FIG. 1 — MAXIMUM USABLE AT-2 REPEATER GAIN IN LOADED LINES OR NON-LOADED LINES



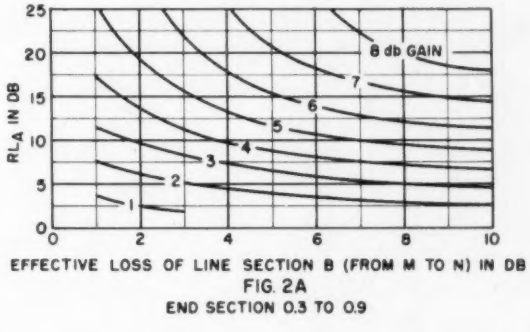


FIG. 2A
END SECTION 0.3 TO 0.9

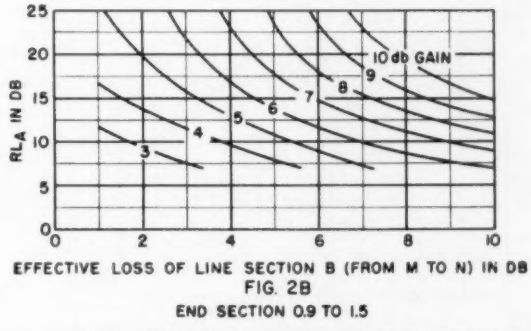


FIG. 2B
END SECTION 0.9 TO 1.5

FIG. 2 — MAXIMUM GAIN FOR REPEATER BETWEEN LOADED AND NON-LOADED LINES

both sides of the repeater during the idle condition. The office side of the repeater may be opened in terminal application as long as the line remains connected to the other side.

Fig. 3 gives the maximum usable gain as a result of the return losses of the line. As in the AT-2 repeater, the return loss of the terminal end should be considered as 0 db.

In many cases, the gain of one AT-23 terminal repeater is not sufficient to permit Via Net Loss (VNL) operation. By using an AT-23 at each end it is possible to get more gain. As mentioned in the first part of this article, it is possible to get even more gain if the two repeaters are placed at least 4 db from each end with 7-9 db loss between them. However, a circuit of this type is seldom considered for practical reasons.

In designing a circuit with an AT-23 at each end, the line can be considered as cut in two. Each section can then be treated as having a terminal repeater. The return loss of the line side, however, should be taken as 0.55 times the total return loss of the line for determining the maximum gain of each repeater.

This would be the same as saying that the total line should be considered as having 1.1 times the actual facility loss in the calculation. *Example 6* explains this process in more detail.

If an AT-23 is operated in tandem with an AT-2, it is better to assign more than 0.55 times gain to the AT-23 than to the AT-2 making the total 1.1 times. This is accounted for by the fact, that up to a certain point, more gain can be obtained from the AT-23 per increase in line section assignment than is lost to the AT-2.

Conclusion

Fig. 4 shows a family of curves which illustrate the maximum gain obtainable using either AT-2 or AT-23 on various attenuation values. These curves can be used to determine quickly the maximum gain obtainable. *Fig. 5* shows a gain assignment chart which has been used in many field applications for the AT-23 repeater.

Examples

All the following examples are based on a structural return loss of 19 db for 22-gauge exchange cable, and 16 db for 19-gauge cable, both H88 loaded where applicable. These are also based on a capacitance deviation per load section (HC) of .027 and 92 per cent of pairs meeting the above structural return losses.

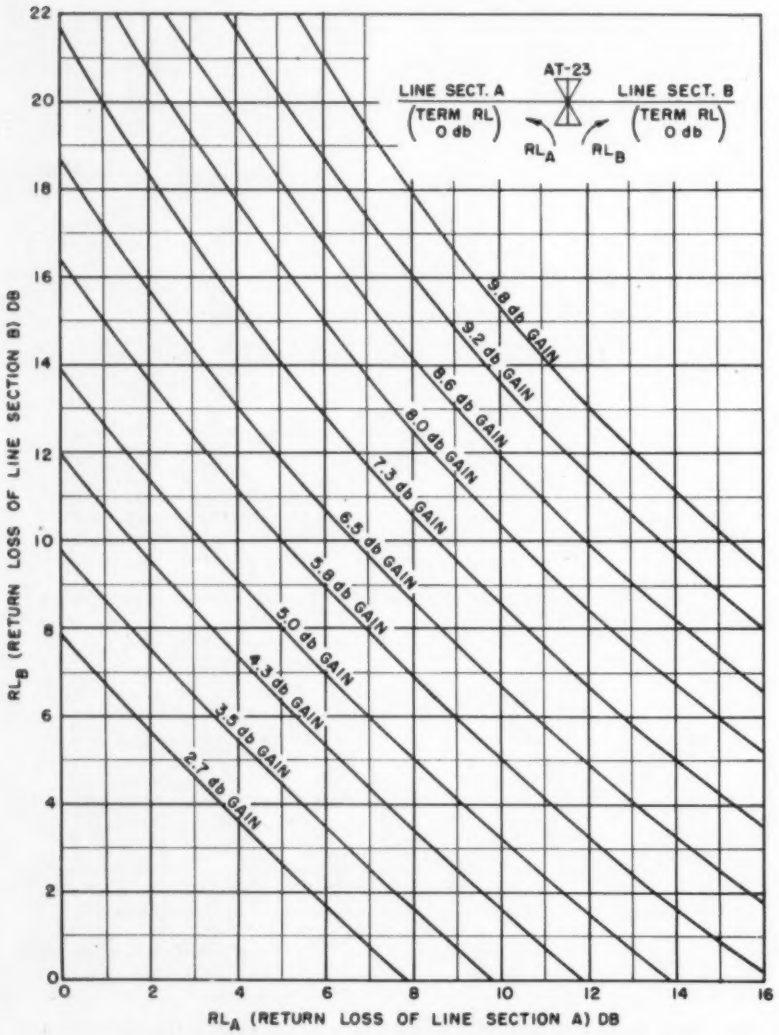
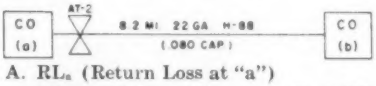


FIG. 3 — MAXIMUM USABLE AT-23 REPEATER GAIN

Example 1

Terminal AT-2 Repeater in Loaded Facility



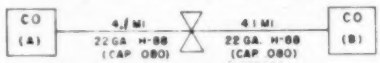
A. RL_a (Return Loss at "a") (Facing CO_a eqpt) = 0 DB

B. Calculation of RL_b (Return Loss at "b")
   (1) Two times attenuation (Table 2) 2 x 6.4 = 12.8 DB
   (2) Structural Return Loss = 19.0 DB
   (3) Combine (1) and (2) on an *Energy Summation Basis* (Refer to Table 1 for F)
   Smaller from Larger
   19.0 - 12.8 = 6.2 DB
   Value of F for 6.2 (Table 1) = 0.9 DB
   F from smaller
   = RL_b
   = 12.8 - 0.9 = 11.9 DB

C. Refer to *Fig. 1* to determine the Maximum AT-2 repeater gain (RL_a = 0 RL_b = 11.9 DB) = 2.8 DB

Example 2

Intermediate AT-2 Repeater in Loaded Facility
(Using same facility as Example 1)



A. Calculation of RL_a
   (1) Two times attenuation (Table 2) 2 x 3.2 = 6.4 DB
   (2) Structural Return Loss = 19.0 DB
   (3) Combine (1) and (2) on an *Energy Summation Basis* (Table 1)

(Continued on page 49)

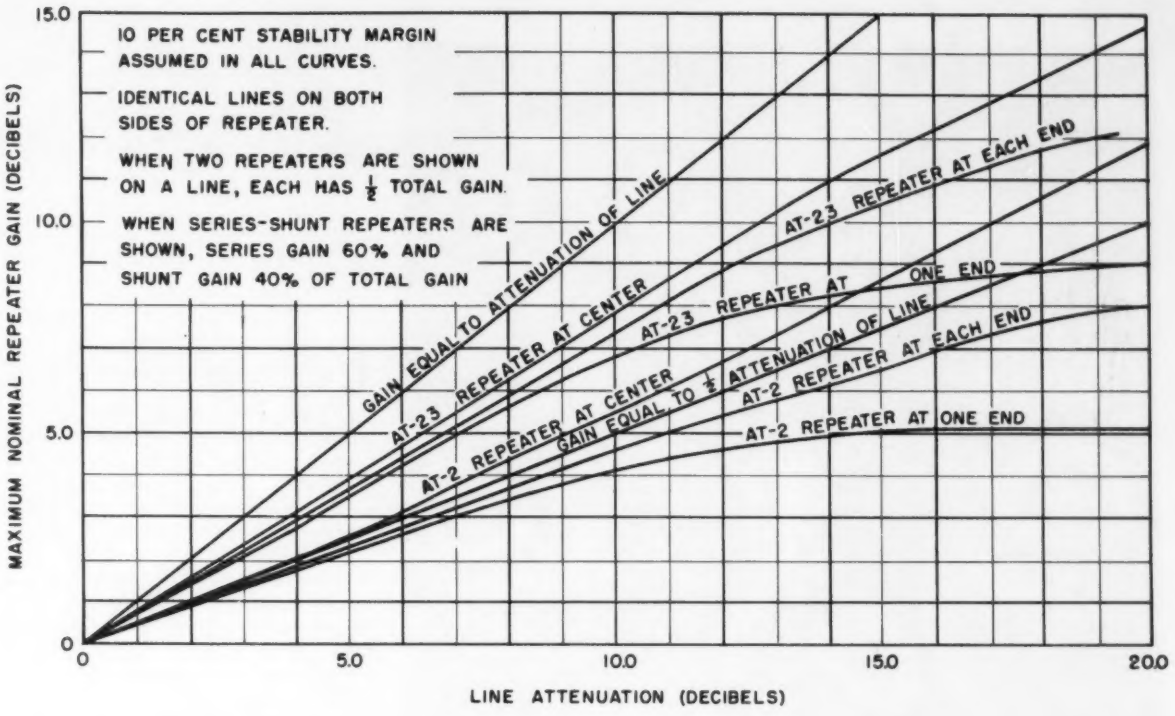

15.0
10.0
5.0
0
0
5.0
10.0
15.0
20.0
MAXIMUM NOMINAL REPEATER GAIN (DECIBELS)
LINE ATTENUATION (DECIBELS)
10 PER CENT STABILITY MARGIN ASSUMED IN ALL CURVES.
IDENTICAL LINES ON BOTH SIDES OF REPEATER.
WHEN TWO REPEATERS ARE SHOWN ON A LINE, EACH HAS ½ TOTAL GAIN.
WHEN SERIES-SHUNT REPEATERS ARE SHOWN, SERIES GAIN 60% AND SHUNT GAIN 40% OF TOTAL GAIN
GAIN EQUAL TO ATTENUATION OF LINE
AT-23 REPEATER AT CENTER
AT-23 REPEATER AT EACH END
AT-23 REPEATER AT ONE END
GAIN EQUAL TO ½ ATTENUATION OF LINE
AT-2 REPEATER AT CENTER
AT-2 REPEATER AT EACH END
AT-2 REPEATER AT ONE END

FIG. 4– MAXIMUM GAIN OBTAINABLE USING AT-2 & AT-23 NEGATIVE IMPEDANCE REPEATER

H-88 LOADED CABLE-TOLL CONNECTING TRUNKS

(NORMAL LOADING SPACING-TRUNKS OPEN AT BOTH ENDS WHEN IDLE)

REPEATER GAIN ASSIGNMENT	FACILITY LOSS RANGE — DB			
	19 LC CABLE	19 HC CABLE	22 HC CABLE	24 HC CABLE
2.7	4.2 - 4.9	4.2 - 4.9	4.2 - 4.9	4.2 - 4.9
3.5	5.0 - 6.1	5.0 - 6.0	5.0 - 5.9	5.0 - 5.8
4.3	6.2 - 7.3	6.1 - 7.2	6.0 - 7.0	5.9 - 6.9
5.0	7.4 - 8.5	7.3 - 8.5	7.1 - 8.5	7.0 - 8.3
5.8	——	——	8.6 - 9.3	8.4 - 9.3

FIG. 5 - AT-23 REPEATER ASSIGNMENT CHART

Frank M. Malone is vice president-operations, west, of the Southern Bell Telephone & Telegraph Co. His comments on building a good company image are reprinted from the June issue of the Southern Telephone *News*.

Why is a Good

IN A BOOK I was reading the other day, the leading character wanted to change her name and the older and wiser advisor said: "You can't go around changing your name. It would confuse people and, anyway, things accumulate around a name, people associate what you've done and what you've been with a name. A name's mighty important."

In this respect, the name of a person or the name of a company both build up associations in people's minds. A name comes to mean something, good or bad, through a building up of impressions not in just one day or a week or a month but throughout a company's or an individual's existence.

For instance, where you work is an identifying mark beside your name in the minds of people you know.

"You work for the telephone company?" someone asks at a party. And instantly, they have an image of you, and know a great deal about the kind of person you are.

"I work for the telephone company," you tell a merchant and he knows fairly well what it will be like to do business with you, to have you for a customer. Unwittingly, it happens and you become "tagged" or "typed" or "identified," because that is the way people think.

Where Do You Work?

This is unavoidable and actually not a bad thing. In the first place, it's a good thing to be able to say proudly that you work for a company.

Certainly, you don't need to apologize when you tell people you work for the largest private enterprise in the South. There is a real pride in being able to tell your neighbor that you work for an industry that assures him communication facilities year in and year out, night and day.

When you tell someone you work for the telephone company, you benefit from the reputation that has been built up over the years by other telephone people who have lived in your community and given telephone service.

You gain acceptance because of what the people who have gone before you

Company Image Important to You?

By FRANK M. MALONE

have done and said and the way they have acted. It rubs off on you—the reputation of your business. And what you are picks up and carries on that reputation. Ten years from now, the reputation of the business will be different, or better, or worse, depending on you.

Good Company Image

That's why when we talk about a good company image, we say it is important to you and me, because the company's image is part of our own reputation. So let's think about what we can do to build onto and maintain the good reputation our business has.

First, our business gets a good reputation through the kind of telephone service we render. It's not wholly dependent on what we did yesterday or the good intentions of tomorrow, but rather our reputation for service builds up today, this hour and the next.

Such long-used phrases as "courtesy," "concern for the customer," "promptness," "keeping our promises" are fairly stable and necessary parts of today's new-fashioned service.

The demand for good manners and honesty and efficiency in business dealings doesn't change. The people you meet will look for the characteristics of courtesy, warmth, friendliness and a certain feeling of concern about others if they find these characteristics in telephone people generally.

Talking Telephone

Second, our business gets a good reputation through what we say and how we talk about the business—not only on the job but off the job.

Our public relations people who make surveys of our customers tell me that about 40 per cent of telephone customers who say they have "close friends" in the company say those friends never talk to them about the telephone business. Now, this is an unfortunate commentary on us.

Without attempting to invade your private lives, it does seem to me that telephone people should become more articulate and should from time to time help explain our company's actions and objectives to neighbors and friends.

This is not only important in your own personal image building (for if you talk intelligently about something you know as well as you know your job and your company, you inevitably gain respect) but it also builds up a better company image (which in turn reflects upon your own.)

Third, our business gets a reputation, very directly and positively so, just from the kind of people telephone folks are.

At the Athens school, and at all other off-job conferences, telephone men and women are encouraged to conduct themselves in such a way, both in words and in actions, that they will be looked upon with respect and admiration; a credit to themselves, their company and their community.

Certainly, this applies to all of us, no matter what our responsibilities are in the business.

Primary Goals

Young people, when they are looking for a job, often have two goals in mind. They want a job that will provide them an adequate income and a job that is socially useful. It seems to me that jobs in our industry fulfill both of these goals. Telephone pay is kept in harmony with the community wage pattern and telephone jobs are a public service.

Of course, in order to maintain our business as it is, in order to continue to offer both adequate pay and improving services, our business has requirements that need to be met.

These requirements can only be fulfilled through public acceptance and understanding. Awareness of the fact that every telephone person is constantly involved in gaining and maintaining this climate of acceptance and understanding is . . . very important to each of us.

I keep referring back to the school for our management men at Athens because what is said there is something that is being passed along to all of us whether we attend or not.

Sometime during the school, the conferees read this quotation from the British poet John Donne. It is the one which Ernest Hemingway used as a title for his book, "For Whom the Bell Tolls." The entire quotation reads:

"No Man is an *Iland*; intire of it selfe; ever man is a peece of the *Continent*, a part of the *Maine*; If a clod bee washed away by the *Sea*, Europe is the lesse, as well as if a *Promontorie* were, as well as if a *Manor* or they *friends* or *thine* own were; any mans death diminishes me, because I am involved in *Mankinde*; and therefore never send to find out for whom the *bell* tolls, it tolls for thee."

Interdependence

Donne was speaking of the interdependence of men and certainly this is true of us and our business.

Everything that happens outside the company affects us and everything which we do affects others.

We can think of ourselves and our responsibilities towards our business and our communities as being those of the spirit or we can view them in just the terms of earning a living for a certain number of dollars and cents.

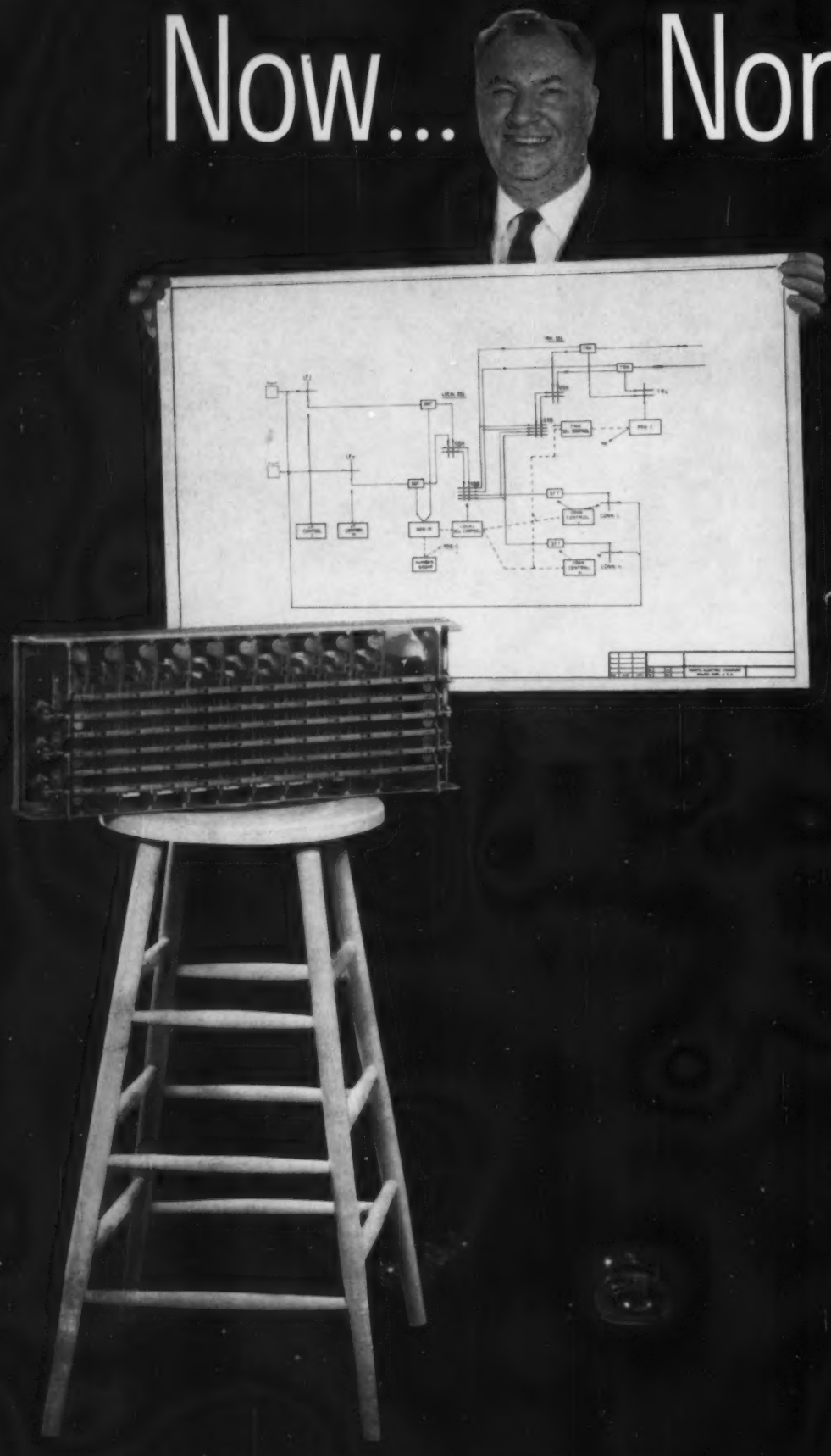
Sooner or later, we become aware that there is a real interdependence between ourselves and others in the business and ourselves and others in the community.

Recognizing this, we like all men of good will, want to do our best to be good citizens, to be socially useful beings. In doing this, we build up an image of ourselves and of our business through our actions.

We gain personal respect and status among our neighbors and friends, but more than that, our right actions enable us to respect our own individual images.

Day by day, through the things you say and the things you do, you are building your own image and the image of the company. It is important that you stop and consider this, for the image you are building today will determine your own personal success and the company's success—now, and a decade from now.

Now... North



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75TH AND GREATEST YEAR

Crossbar for even the smallest exchanges

The new North NX-2 and NX-3 bring to medium and small exchanges the inherent advantages, efficiencies and operating economies which have proven North By-Path Crossbar switching equipment the finest available to the Telephone Industry!

Any exchange, regardless of size, planning cut over to dial operation can now convert to equipment that will outperform anything on the market today—North NX-2 and NX-3 Crossbar.

The development of these two Crossbar systems is another outstanding engineering achievement aimed to strengthen the operations of the Independent operating Telephone Companies—another engineering "first" from

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

Galion, Ohio

REA OK's Eight Loans Totaling $997,000

EIGHT TELEPHONE loans approved by the Rural Electrification Administration during the week of Sept. 21 will aid in providing new or improved service for 1,491 subscribers in six states. The loans were approved as follows:

Champaign County Telephone Co., 205 West Springfield Ave., Champaign, Ill.; $78,000; Sept. 21.

This loan will help in enabling the borrower to improve service for 167 subscribers and to furnish initial service to 35 subscribers. The present subscribers now receive magneto service from the Wellington Mutual Telephone Co. which the borrower recently acquired with its own general funds.

A new dial central office will be constructed at Wellington. REA loans to the Champaign county company now total $2,696,132 which will enable it to furnish new and improved service to 5,726 subscribers. The completed system will consist of 18 dial exchanges. Fifteen are in operation, furnishing dial service to approximately 4,616 subscribers.

James L. Capel is president and Max G. Hoagland is manager of the Champaign County company.

•

Minnesota Central Telephone Co., Hector, Minn.; $75,000; Sept. 21.

These funds will enable the borrower to finance an addition to its existing commercial-dial office and garage building at Hector, and to complete its authorized system.

REA loans approved to this company total $1,411,000 and will benefit 3,047 subscribers. The 10 exchanges of the system are now furnishing dial service to approximately 2,725 subscribers.

Alfred L. Ericson is president and Harold Ericson is manager of the Minnesota Central company.

•

Red River Telephone Association, Barnesville, Minn. (Mailing Address: Abercrombie, N. D.); $200,000; Sept. 21.

These and funds from a prior loan will enable the borrower to improve service for 94 subscribers and to furnish initial service to 196 subscribers. The existing subscribers now receive magneto and dial switching service from the Andrews Telephone Co. and the Skree Telephone Co. which the borrower has recently acquired. Funds are included in this loan to reimburse the Red River association for these acquisitions.

The borrower plans to construct a new dial central office at Rollag to replace the existing magneto facilities there. REA loans to this borrower, now totaling $717,000, will make possible new and improved telephone service for 1,052 subscribers in Minnesota and North Dakota. The completed system will consist of four exchanges. Those at Abercrombie, Colfax, and Mooretonall in North Dakota—are now furnishing dial service to approximately 640 subscribers.

Walter W. Garven is president and Wayne Holmquist is manager of the Red River association.

•

Home Telephone Co., Olive Branch, Miss.; $39,000; Sept. 21.

These funds will enable the borrower to furnish initial service to 55 subscribers in its service area. REA loans to the borrower now total $502,000 and benefit 1,038 subscribers primarily in Mississippi. There will be a few subscribers in Tennessee. The completed system will consist of exchanges at Byhalia and Olive Branch which now furnish dial service to approximately 980 subscribers.

Lon J. Darley Sr., is president and manager of the Home company.

•

Blue Mountain Telephone, Inc., Spray, Ore.; $45,000; Sept. 21.

This loan will help complete the borrower's authorized system.

The two REA loans to this borrower, totaling $602,000, will make possible new and improved service to 553 subscribers. The completed system will consist of dial exchanges at Long Creek, Mitchell, Monument, and Spray. All of the exchanges are in operation.

Robert Ashmead is both president and manager of the Blue Mountain company.

•

Florence (Miss.) Telephone Co.; $144,000; Sept. 21.

These funds will enable the borrower to provide service for 265 new subscribers, increase the proportion of private and semi-private lines, install dispatch type mobile dial radio facilities for system maintenance, and complete its authorized system. All of the new subscribers will be located in the Florence exchange area which will be enlarged.

REA loans to this borrower now total $1,238,000 which will make possible new and improved service for 2,670 subscribers. The system, when complete will consist of three dial exchanges. The exchanges are in operation and are furnishing service to approximately 1,800 subscribers.

Webb D. Shivers is both president and manager of the Florence company.

•

Utah & Wyoming Independent Telephone Co., Randolph, Utah; $206,000; Sept. 22.

These funds will enable the new borrower to improve service for 167 existing subscribers and to furnish initial service to 81 subscribers. The company now furnishes magneto service through the Randolph central office. New dial central offices will be constructed at Randolph and at Woodruff.

Clarence E. Clark is president and manager of the Utah & Wyoming company.

•

Camden (Ind.) Telephone Co., Inc.; $210,000; Sept. 25.

The new borrower proposes to use these funds to improve service for 402 existing subscribers and to furnish initial service to 29 subscribers. The company now provides magneto service.

The company plans to purchase a new site and construct a combination headquarters and dial central office building in Camden.

W. O. Pettiner is president and John McCain is manager of the Camden company.

Fla. Man Receives General System's La Croix Award

Edward R. Jackson of Winter Haven, an employe of the General Telephone Co. of Florida on Sept. 11 was presented with the General Telephone System's LaCroix award for heroism by the Florida company's president Carl D. Brorein.

Mr. Jackson was cited for his part in saving the life of Jim Noles, a boat yard worker who was burned on over 40 per cent of his body in a fire in an Eloise boat works in December 1958.

Mr. Jackson received a $1,000 cash award as well as the silver LaCroix medal.

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

THE FOLLOWING item on color coding of cable is quoted from *On The Line*, a publication of the Australian Post Office, Engineering Division. Please note how their spelling of certain words differs from ours.

"Plastic cable supplied after 1st January, 1958, will have a new colour code.

"In plastic cable, the wires of a pair do not always remain twisted together when the sheath and tapes are removed and, with the old code, there was a distinct possibility of splitting pairs.

"In choosing the new colour code, the Department had 10 standard colours from which to choose. Polythene is made up in these 10 colours only. If striped insulation could be used, a wide range of combinations could be employed but, at the present stage of development, it is not possible to apply coloured markings to polythene.

"Identification of the conductors will be simplified with the new colour code which is:

Pair in centre and each layer	*"A" wire*	*"B" wire*
1st	Orange	White
2nd	Red	Grey
3rd	Blue	Brown
4th	Yellow	Violet
5th	Green	Black
6th	Red	Grey
7th	Blue	Brown
8th	Yellow	Violet
9th	Green	Black
10th	Red	Grey

and so on.

"In other words, there is an orange-white marker in the centre and in each layer, the remaining colours rotating through red-grey, blue-brown, yellow-violet, green-black."

•

The *Engineer*, published by the Western Electric Co., describes experiments being conducted by the Bell System to utilize low-voltage percussion welding to connect wires to apparatus. This is certainly an interesting idea which appears to possess numerous advantages.

In recent years, intensified investigation of the wiring of Bell System's apparatus and equipments has pointed to the need for even faster and more economical methods of connecting wires to terminals. The requisites for any new connecting means are many and rigorous.

First, it must obviously be adaptable to automatic manufacturing, and electrical resistance in the joint should be low and constant. The connecting tool should be reliable, operate with high speed and cause no heat damage to plastic-insulated wires. It should be adaptable for use on the "new art" miniaturized equipments and it should require a minimum of critical materials such as copper, tin and lead.

Resistance welding requires that the parts to be joined be butted together or overlapped. Pressure is applied to the contacting surfaces and a specific electrical resistance results at the abutted or overlapped surfaces. A high current is passed through the parts and heat is generated.

The time and current are controlled to obtain only enough heat to melt the contacting surface areas which are held together until the metal solidifies, after cessation of the current flow.

•

DDD service was widely publicized when it was made available to the Washington, D. C. area. Despite this, however, many telephone users either misunderstood or disregarded the instructions on how to utilize the new service.

Many dialed the letters DDD on the dial which in Washington is the FEderal 3 exchange, and then the desired telephone number. This resulted in wrong numbers and considerable confusion.

This is just another example where letters on the dial prove a detriment to good telephone service. We are confident that all-numeral telephone numbers will eventually come into general use.

•

We have a letter from a reader who informs us that he has perfected a device which will warn a telephone user that another party is attempting to call his number. This inventor claims that this is a simple device that can be added to a dial system at a reasonable cost and may be furnished telephone customers as an extra service.

This device, if practicable, should prove worth-while. It would permit a telephone user to terminate one conversation so as to accept another.

•

We recently rode an Eastern Air Lines jet-powered Electra from Washington to New York when the air was full of thunder storms. The pilot, with the help of the storm warning radar, did a wonderful job of avoiding the bumps. In fact, it proved to be a very smooth flight.

We shall never cease to marvel at the wonders of modern air travel.

•

Back in 1948, the Bell System in Nevada served only 25,000 telephones. Now, after 11 years, this number has doubled and they serve 50,000.

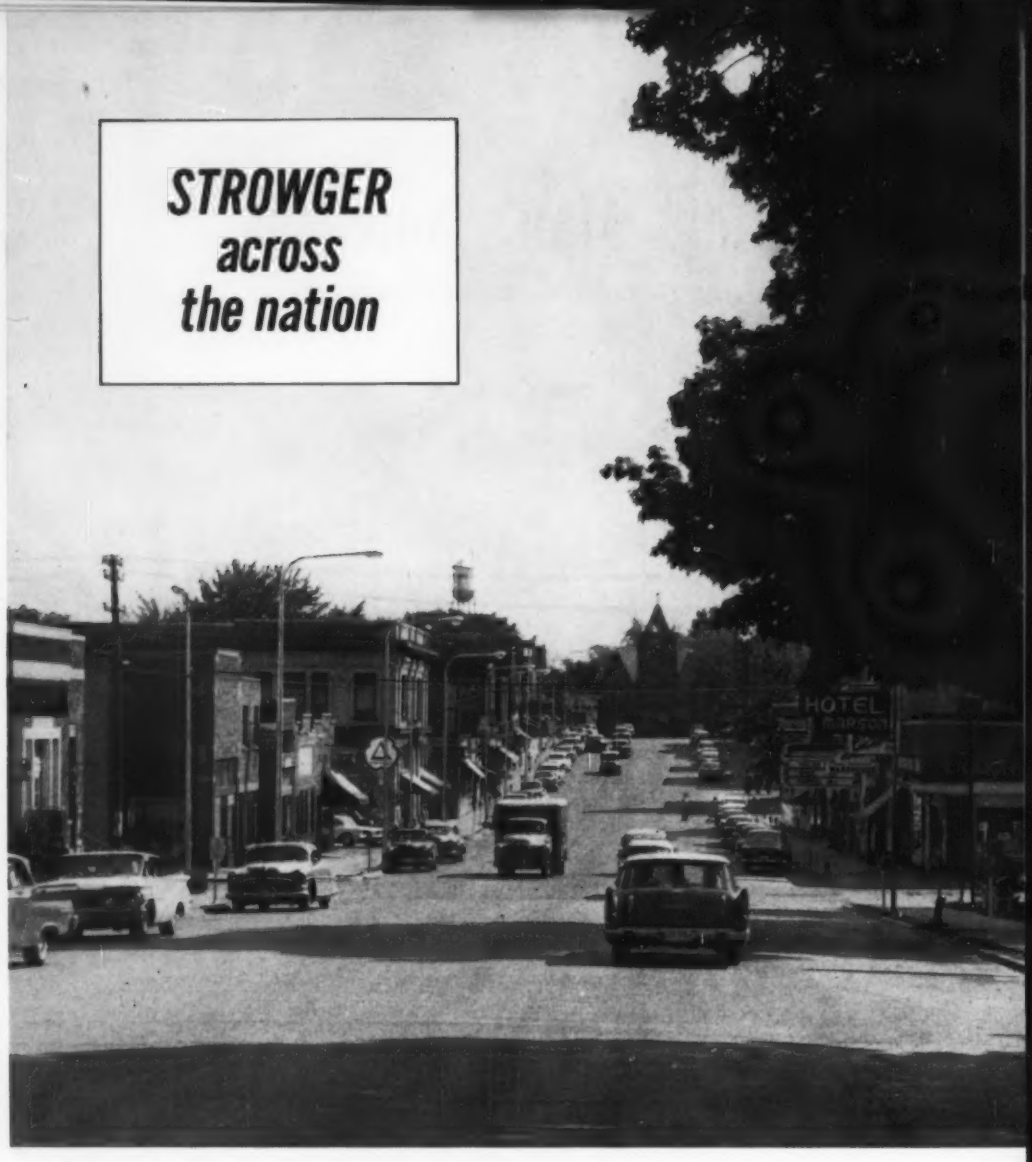
Actually, Nevada has a total of 110,000 telephones served by Bell and 14 Independent companies. This averages out to one telephone for every square mile in the state.

Nevada is said to be one of our fastest growing states.

•

When modern children are told the Cinderella story they may very well ask: "When the pumpkin turns into a golden coach, is that straight income or capital gains?"

STROWGER across the nation



DOWNTOWN Clintonville has a number of fine stores, a modern hotel, excellent banking facilities and a $70,000 community center. Present estimates place Clintonville's population at about 5,000. The vast majority of these people own their homes.

CLINTONVILLE, WIS.

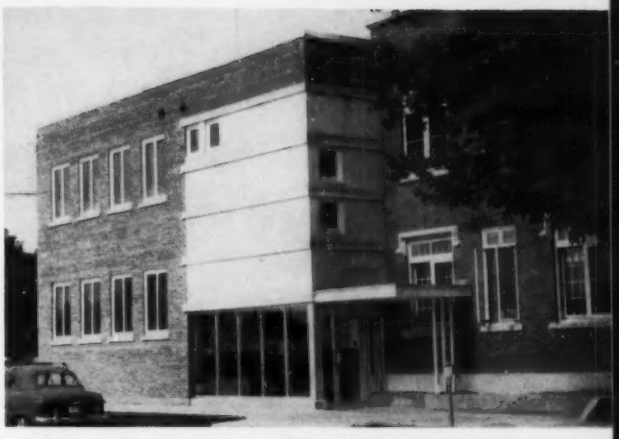
A healthy balance of farm and factory gives Clintonville a sound foundation for its present and future prosperity

Clintonville, Wisconsin, lies midway between Green Bay and Stevens Point. Rich dairy land surrounds the community. Within this farm belt, thriving factories manufacture various products, including trucks, conveyors and gloves. This division of industry and agriculture gives Clintonville a stabilized economy and assures its people of continuing prosperity.

Visitors to Clintonville will find modern schools, civic buildings, clinics, a well-staffed hospital and many churches. Clintonville is a popular vacationland. There are hundreds of miles of productive trout streams, wooded land, sparkling lakes and a variety of recreation facilities.

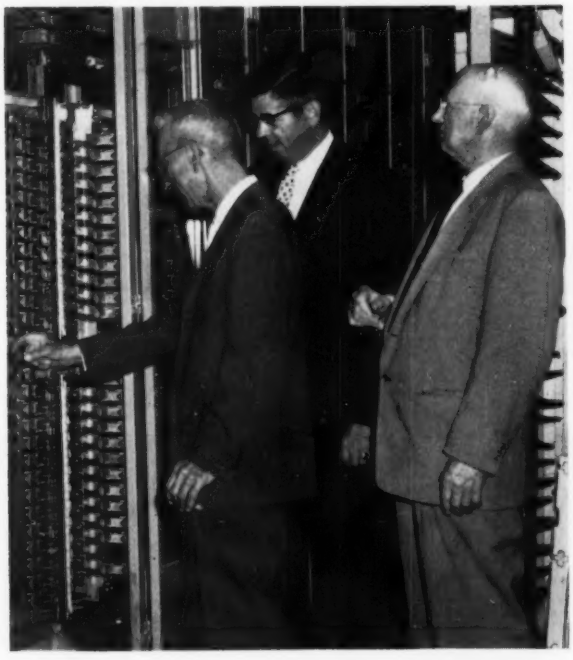
Clintonville is served by Urban Telephone Company. Each day, Automatic Electric step-by-step switches work behind the scenes to give dependable, low-cost telephone service. Yes, Clintonville is another success story of Strowger Across the Nation.

PAKISTAN BOUND. The Terracruzer shown here was ordered for use in the oil fields of Pakistan. It was built by the famed FWD Corporation, who employ more than 1,000 people. Other firms in Clintonville include Hansen Glove Corp., Atlas Conveyor Co., and Shawano Canning Co.



URBAN TELEPHONE COMPANY has six exchanges. Its headquarters are in the Clintonville exchange and business office (shown above). Clintonville is a pioneer in dial service, having converted in 1929 with Strowger. Since then, Clintonville has increased its number of lines to 1,000.

H. A. RINDT (right), president, Urban Telephone Company, looks over Strowger equipment in the switching room of Clintonville exchange. With him are (left to right) H. N. Bovee, general superintendent; and F. H. Schafer, secretary and general manager.



NATIONAL SAFETY COUNCIL holds its annual driving tests each year at Clover Leaf Lakes, just four miles from Clintonville. These tests help determine the safeness of America's newest cars. This important project receives substantial help from the Clintonville Chamber of Commerce.

AUTOMATIC ELECTRIC

GENERAL SYSTEM

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

Anson's original dial office, reinforced, ready for pick-up.

Telephone Service on the Move

Anson office mobilized, ready to move.

Short delay at low-slung cable.

Transport Dial C. O. 250 Miles

NOWADAYS there is nothing earth-shaking or unusual about a town getting an automatic telephone office. But when Pyote (rhymes with coyote), Tex., an exchange of Southwestern Bell Telephone Co., got its dial office recently, it was both earth-shaking and unusual.

Pyote's automatic central office—a 20-year-old Automatic Electric veteran from Anson, Tex.—rolled into town about 2 pm. on Aug. 28 behind a 10-ton diesel tractor. It had traveled about 250 miles.

By 5:30 pm. it was firmly set—60,000 pounds of building and equipment—on a new foundation surrounded by cat's claw cactus, prickly pears, bean-laden mesquite, sand, and ant hills on a lot just east of Pyote Air Force Base.

Swinging a 20-pound sledge hammer into the old foundation at Anson about 10 a.m. on Thursday, Aug. 27, 6½-foot, 300-pound Gerrel Bigham of Snyder, Tex. started the moving project.

Movers Get Ready to Roll

Gerrel is one of five sons of W. K. Bigham who operates a five-state house moving business. He teamed with younger brother, Burly, and James Carter of Snyder to lift the 16-by-28-foot structure onto two 50-foot steel beams and two sets of wheels. They were ready to roll by 3:30 pm.

"How fast can you go with a rig like that?" an onlooker asked.

"Oh, we could do 60 if we wanted to, but it scares people," Gerrel said. "We'll probably do about 30."

Slowed down briefly by a low-slung telephone cable two blocks south of the old office site in Anson, the two-vehicle caravan—Carter in the guide truck about 50 yards ahead and Gerrel at the wheel of the big diesel—rolled west on Highway 180 through cotton, watermelon and sorghum fields toward Snyder.

Police Escort

A Snyder police car met the Bighams at the city limit to escort them through town. About a block east of the square, the driver of a Ford convertible, "made in Texas by Texans," slowed down to 10 miles an hour behind the rolling dial office. He honked wildly for Gerrel to move over. Gerrel didn't. A grocery store was in the way.

The movers parked the load overnight about 6 miles west of Snyder. At 6 am Friday they were again moving west on 180 toward Lamesa.

From Lamesa, the caravan sliced southwest through irrigated cotton and sorghum fields, deep and shallow Permian oil well fields of Andrews County, sand dunes and oil storage fields of the Kermit-Wink area, into Pyote.

Air Force Request

Moving day's plans began when the air force asked Southwestern Bell Telephone Co. to furnish dial service as soon as possible to some 50 families at Pyote who keep house for the now inactive air force base.

This town of 201 citizens was the site of a bustling air base during World War II and—more recently—a graveyard for thousands of obsolete B-17 heavy bombers that helped to pulverize Hitler's war muscle.

Pyote is now served by less than 20 long distance lines out of Monahans and Pecos—15 and 23 miles east and west, respectively.

As soon as Southwestern Bell construction and installation crews can build lines and hook up telephones, the people of Pyote will have local dial service.

Answer on Tap

If Southwestern Bell had built Pyote an automatic system from scratch, it would have taken months of planning, tailoring and manufacturing of equipment, and a chunk of money that even oil-rich west Texas wouldn't sneeze at.

When the air force placed its hurry-up order, Southwestern Bell just happened to have the answer on tap.

Anson outgrew its dial system about six months ago. It converted to a new, bigger dial system in June, 1959.

The old automatic office, put in service in 1939, made history at the time it went to work. Anson then became the smallest town in the nation to have dial telephone service.

When Anson cut to the bigger office

(Continued on page 57)

At destination—less than 24 hours after start from Anson.

See how Leich's Cuts Outside Plant

In growing areas, the cost of providing telephone service is becoming more and more expensive. Leich's Line Concentrator provides many ways to economically solve this problem. It lets you add telephones in an area without installing additional outside plant.

By distributing a number of subscriber lines over a few trunks to the central office, it greatly reduces outside plant costs. It uses the same principle that is the basis of all central office layout; among a large group of subscribers, only a few will require telephone service at the same time.

A concentrator installation consists of two units—an exchange unit and a remote subscriber unit. No power is required at the remote distribution point. No modifications are necessary in the central office switching equipment, which can be either manual or dial.

Here's a Typical Problem

Seventy stations are served by a 25 pair cable into an area, and no spare facilities are available. You are faced with a demand for upgraded service by most of the seventy subscribers. What's more, a new housing development will soon require an additional 12 lines.

To furnish the desired service, you would normally add 25 cable pairs. In this case, it would mean replacing 3200 feet of 26 pair cable with 51 pair at a cost of $2,200. An additional $6,800 would have to be spent on feeder cables. Your total costs would be approximately $9,000.

LEICH GENERAL SYSTEM

Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

Line Concentrator Costs in Growing Areas

Leich's Line Concentrator Cuts Costs 50%

Since Leich's Line Concentrator lets you "concentrate" the calling load of a large group of lines onto a few cable pairs, it would *not* be necessary to add the new and larger cable facilities. For example, Leich's 49-9-2AZ Concentrator uses only eleven cable pairs for 9 traffic trunks (with 2 pairs for control purposes) to serve 49 subscriber lines. Any 11 of the cable pairs may be used for the concentrator trunks and control leads, and the subscriber lines formerly served thereon shifted to concentrator lines. For maximum effectiveness, lines on which the traffic is light are best suited for concentrator assignments. You would then be able to upgrade existing service, furnish the 12 lines to the new housing development, and be able to absorb some future growth without addition of cable.

The 49-9-2AZ Line Concentrator, including the All Trunks Busy option and weather-proof cabinet for mounting the subscriber end unit costs you only $4,205 plus your installation costs. Since the conventional cable relief job would cost $9,000, your expense is halved.

Prompt Delivery From Stock on Two Models

Two basic sizes of the Leich Line Concentrator are available from stock. They can be shipped within 30 days from receipt of order.

The 49-9-2AZ, is equipped with 49 lines and 9 traffic trunks and 2 control trunks. The 49-18-3AZ is equipped with 49 lines, 18 traffic trunks, and needs three pairs for control purposes. The latter unit will accommodate a higher calling rate.

There are so many different ways you can use the Line Concentrator to save on plant costs, to upgrade service or to add customers. A Leich sales engineer is available—no obligation—to tell you the whole story. Write today.

LEICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS
PACIFIC COAST: 11481 W. PICO BLVD., LOS ANGELES 64, CAL.
EAST: 3651 CONNECTICUT AVENUE, YOUNGSTOWN, OHIO
SOUTHWEST: 1227 SLOCUM STREET, DALLAS 7, TEXAS
SOUTHEAST: 5126 SOUTH LOIS ST., TAMPA 11, FLORIDA
manufacturers of telephones, switchboards and related apparatus since 1907

Wis. Association Holds 3-Day Merchandising Workshop

THE FIRST Telephone Merchandising Workshop presented by the Wisconsin Telephone Association, and sponsored by the University of Wisconsin Management Institute, was conducted in the new Wisconsin Center Building on the university campus in Madison Sept. 15 to 17. Operating telephone companies sent 25 men to the workshop—the limit of the enrollment.

Activities commenced on Sept. 15 at 5 p.m. with a dinner. This was the get-acquainted session where enrollees had an opportunity to meet and learn ground rules of the workshop. Wisconsin Association President F. H. Schafer welcomed the group.

Ben Smith of St. Louis, Mo., general merchandising manager of Southwestern Bell Telephone Co., served as discussion leader at the initial conference on Sept. 16. He explained the importance of selling, developments in our economy, and the relationship of the economic developments to the telephone industry.

Mr. Smith gave many selling tips, among which are that the more telephones a subscriber has, the more important the service becomes to him; that selling of additional service is best accomplished through suggestion, rather than pressure, and that prospects should not be prejudged by salesmen.

In clarifying the last point, he said that a mistake most frequently made comes from an assumption that the prospect cannot afford more service. However, Mr. Smith said, if the prospect can afford a dollar or two a week for a television set, or other electrical appliance, he will have 25 cents a week for a kitchen or bedroom telephone.

The best sales force in Mr. Smith's opinion, consists of installers or combinationmen, who have access to prospects' homes and offices. They can be most effective when they have the product with them so the subscriber can see and touch it.

"On the spot" sales are most productive, Mr. Smith said, and inventories should be maintained to make this possible. Too often the subscriber is "sold" only to learn that it will be days or weeks before he can have the color or additional telephone he wishes. Delay in delivery of a product frequently brings cancellation of the order, he pointed out.

The group were shown statistics which revealed that the percentage of U. S. families in the $4,999 and less annual income bracket dropped approximately 10 per cent between 1952 and 1957, while the number of families receiving more than $5,000 per year has increased in the same period. This is significant as it shows that more money for new services is available. The telephone industry, however, must create the demand for these services through better marketing of its products. Less than 1 per cent of today's household budget is devoted to communications, Mr. Smith said.

(Continued on page 41)

In attendance at the Wisconsin Telephone Association's first telephone merchandising workshop are FIRST ROW, left to right: B. F. Smith of Southwestern Bell Telephone Co., George F. Griffin of Amery Telephone Co., Donald A. Anklam of Rhinelander Telephone Co., Ray J. Riordan of the Wisconsin Telephone Association, W. L. Cash of the United Telephone Co., R. H. Campbell of the General Telephone Co. of Wisconsin, Paul R. Parsons of Rhinelander Telephone Co., and D. J. Dougherty of Northwestern Telephone Co. (Ill.). SECOND ROW: F. H. Heidt of the General Telephone Co. of Wisconsin, Robert H. Keating of Amberg Telephone & Telegraph Co., Edgar Thom of Pioneer Telephone Co. (Minn.), K. E. Corlett of Wisconsin Telephone Co., Arnold M. Anderson of Viroqua Telephone Co., Bernard Smith of Wood County Telephone Co. and Dick E. Kendall of Mankato (Minn.) Citizens Tel. Co. THIRD ROW: Ken Boyer of Wisconsin Tel. Co., B. F. Stalter of General Telephone Co. of Wisconsin, E. M. Long of North-West Telephone Co., J. F. Benjamin of Cumberland Telephone Co., Harvey J. Haskell of La Crosse Telephone Corp., Syd R. Peterson of Niagara Telephone Co. FOURTH ROW: Prof. William F. Stilwell of the University of Wisconsin, Joseph M. Keating of Thorp Telephone Co., K. A. Larson of Pioneer Telephone Co., H. S. Hankins of Urban Telephone Co., Glenn Randall of the General Telephone Co. of Wisconsin, Dean Parish of Platteville Telephone Co., Warren L. Snyder of Footville Telephone Co. and Charles F. Eskrich of the Middle States Telephone Co. (Ill.).

HERE'S HOW ANACONDA DIRECT BURIAL WIRE & CABLE MAY SAVE YOU MONEY

New advances in insulation and jacket materials, termination equipment and plowing techniques now, make Direct Burial Wire and Cable Systems more economical in many areas.

Telephone wire and cable plants are now being buried directly in the earth.

That's where Samuel Morse attempted to place the first commercial line in 1843. He designed a direct burial, fully color-coded cable for America's first telegraph line between Washington and Baltimore, but his insulation proved defective and Morse was forced to take the conductors out of the cable, separate them and string them on poles with crossarms.

Now, the four freedoms of buried plants – (1) freedom from storm damage, (2) freedom from tree clearing and retrimming expenses, (3) freedom from the safety hazards associated with power contacts and pole climbing, and (4) freedom from right-of-way procurement difficulties – can be yours at actual savings in cost.

Anaconda's high-molecular weight polyethylene insulation – tough and resistant to many direct burial hazards – is part of the reason. The use of this rugged, crack-resistant material, together with new terminals and new plowing developments, have overcome most of the problems that formerly stood in the way of economical direct burial applications. Now in selected areas, a direct burial system may cost you less – in initial installation and in maintenance – than an aerial plant!

On the following pages, you will find pertinent questions and answers that show why and how Anaconda direct burial wire and cable may make possible important savings. Read these pages. Then give careful consideration to direct burial wire and cable for *your* telephone system.

THESE DIRECT ANSWERS TO DIRECT BURIAL QUESTIONS PROVE HOW ANACONDA CABLES COST LESS TO INSTALL...LESS TO MAINTAIN!

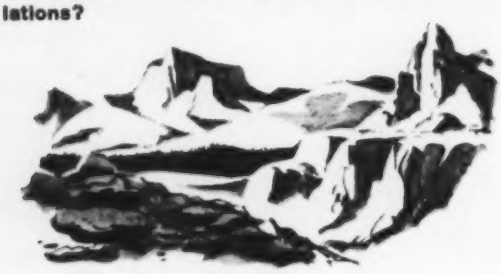
GENERAL

Q. What developments in recent years have made buried-plant costs comparable to aerial plant?

A. First, the increased availability of polyethylene at lowered cost. The use of polyethylene as insulation and jacket, thereby taking advantage of its excellent electrical and physical properties, results in a corrosion- and moisture-resistant cable nearly ideal for direct burial purposes. Second, properly designed diesel-powered plowing equipment, reduces labor and other associated costs of burying cable.

While aerial plant costs have tended to increase, the costs of buried plant have been reduced to a level where, in many cases, they are equal to or less than aerial plant.

Q. What are limiting factors to buried-plant installations?



A. Buried-plant placement costs are materially effected by terrain; rocky or built-up areas or paved streets and sidewalks can make economical plowing impracticable to the extent where even the lower-than-aerial maintenance costs are insufficient compensation. Planning ahead, such as with a suburban-housing builder, can often result in an economical buried plant at a saving over aerial plant. So much of suburban and rural areas are quite suitable for modern planning operations that the future of buried plant is extremely optimistic.

TRANSMISSION

Q. Are there any transmission problems peculiar to buried plant?

A. No. There is no difference between open wire and cable circuits whether the cable is aerial or buried.

APPLICATION

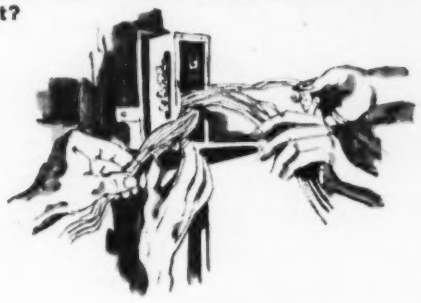
Q. Splicing has always been troublesome. Has this problem been licked with the new products?

A. Yes. Pedestal-mounted housings, which are available from a number of manufacturers, have been designed for this purpose. The buried cables or wires are brought into the weatherproof housings and terminated on terminal strips. This system not only removes a possible source of trouble resulting from buried splices, but provides convenient facilities for efficient installation, testing, and maintenance.

Q. How are customer services connected to buried plant?

A. Special terminals mounted on pedestals are now available for buried plant. The buried wire or cables are brought into the terminal housing and the proper pairs terminated. Service drops, aerial or buried, are connected to the terminal strips just as to aerial cable terminals.

Q. What about electrical protection of buried plant?



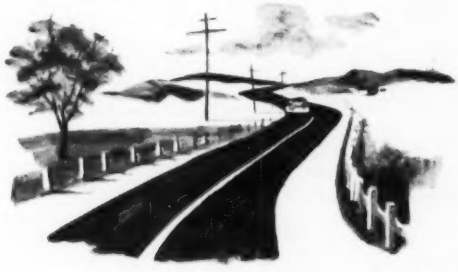
A. The built-in high-dielectric strength of buried cable and wire minimizes the need for special protection (see construction details, page 4). The shields of the wire or cable should be grounded to all pedestals and, wherever it is convenient, connected to good electrical grounds. When long runs of open aerial plant are connected to buried cable, suitable protector blocks should be used.

PLOWING TECHNIQUES

Q. What type of plowing equipment is generally used with the buried wire and cable described?

A. The most desirable plow is one that makes a slot by compressing the earth just wide enough for placing the cable. The cable is fed down through the plow blade, which is maintained at the proper depth, in a smooth tube having a means of bending the cable without damage, and is placed in the bottom of the slot. Since the cable has been plowed with minimum disturbance to the surface, backfilling is not required.

Q. Is the plowing done on private or public rights-of-way?



A. The cost of the private rights-of-way, fences, farm crops, etc., generally makes it too costly to plow main cable runs along private rights-of-way. The best location is along highway rights-of-way. In some cases, the highway shoulders are used. In others, the extreme edges of the highway right-of-way is preferred. In all cases, the highway officials having jurisdiction should be consulted and a permit obtained. Experience has shown that if the highway engineers are properly informed as to the type of plowing involved and the minor disturbance to the highway surface, they will grant a permit since buried plant eliminates a pole line and the necessity of extensive tree clearing along the highway.

Q. What plowing depths are usually used?

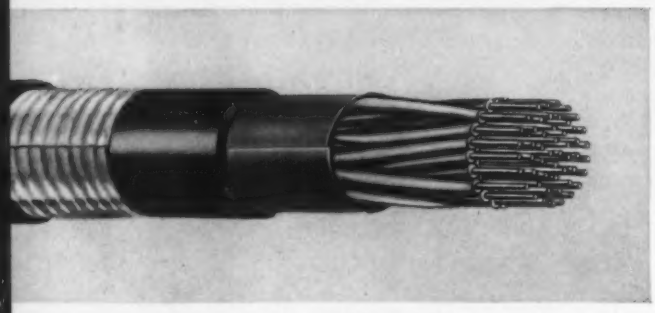
A. Normal depths of 24 inches for cable and 18 inches for buried wire have been found satisfactory in most areas. Where rocks, ditches, or other obstacles are encountered, the depths will need to be modified.

MORE INFORMATION ON FOLLOWING PAGE ⟶

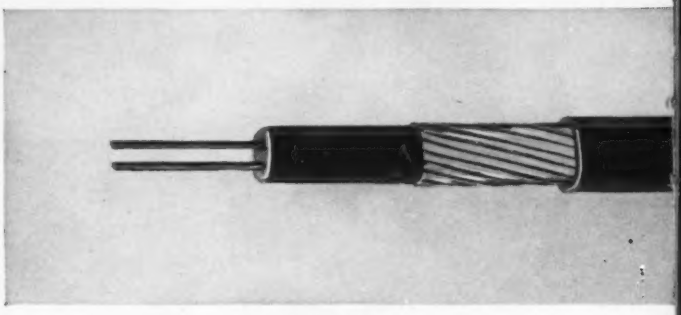
THE INSIDE FACTS ON

THE CONSTRUCTION OF ANACONDA DIRECT BURIAL TELEPHONE WIRE AND CABLE

See for yourself why Anaconda Direct Burial Telephone Cable resists underground hazards . . . gives long life and dependable service



TYPE PCP AND PCPG



TYPE BW

DIRECT BURIAL CABLE:

Cable Core: Conductors insulated with high-molecular weight color-coded polyethylene provide excellent electrical properties with great mechanical toughness and crushing resistance.

Inner Jacket: This inner jacket consists of high-dielectric strength polyethylene. It provides a second line of defense against moisture penetration in the event that the outer jacket is damaged. It also provides a high-dielectric strength barrier against lightning impulse breakdowns between the pairs and the shield.

Shield: The PCP type has 5 mils of longitudinally applied *copper* tape, rather than aluminum tape used in aerial cable. The copper provides a corrosion-resistant, low-resistance shield. This shield, coupled with the high-dielectric strength of the inner jacket, makes the over-all cable highly resistant to lightning damage. The copper shield also provides mechanical protection against the attacks of termites and rodents.

In areas where gophers are known to exist, additional protection against attacks by these rodents has been found necessary. For this purpose, the copper shield thickness has been increased from 5 mils to 10 mils and cables with this shield thickness are designated PCPG.

Outer Jacket: High-molecular weight polyethylene, highly resistant to abrasion, weathering, moisture, fungus, corrosion and environmental cracking.

DIRECT BURIAL WIRE:

Insulation: Conductors insulated in parallel with black high-molecular weight polyethylene. The insulated core has a rounded oval shape to facilitate tight fit of the steel armor wires – thus minimizing capacitance unbalance to ground.

Shield: A helical serving of closely spaced flat steel wires for mechanical protection against attacks of termites and rodents. The shield wires are flooded with an asphaltic base compound to resist corrosion. The shield, coupled with the very high-dielectric strength of the core, provides excellent resistance to lightning damage. The helical method of application of the shield wires also results in their contributing substantially to the tensile strength of the wire (over 400 pounds) which is needed to withstand stresses in installation and operation.

Outer Jacket: A tough, flexible thermoplastic jacket provides added mechanical protection for ease of installation and longevity of operation.

PHONE THE MAN FROM

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FOR TELEPHONE CABLE

the independent manufacturer for the independent telephone industry

Ken Boyer, assistant vice president —merchandising and public relations, of Wisconsin Telephone Co., discussed the various tools used in sales planning and merchandising. He stressed the importance of setting up both long and short-range programs, and urged telephone companies to develop ways of accomplishing marketing surveys with whatever means they have available. Knowing what a company has to sell and concentrating on the high profit items are essentials of successful merchandising, Mr. Boyer pointed out. He also emphasized the vital role plant employes play in a successful selling campaign.

The second evening of the seminar was devoted to a case study. Four committees were appointed to review problems of an operating telephone company that had difficulty meeting its obligations to the public — although from the data presented in a 23-page script of its operations the firm appeared to be a healthy, going concern.

The case was designed as a challenge to managerial acumen. Evidence of the problems was apparent, but the route to the solution was entwined with personnel difficulties, job identification, public relations and merchandising.

The committees were directed to consider all facts and report recommendations for solutions to the company's problems at the next morning's session. Prof. E. C. Bursk, editor of the *Harvard Business Review*, and professor of Business Administration of Harvard University, handled the three-hour case discussion, which brought excellent audience participation.

On completion of the case study assignment, Professor Bursk directed attention to marketing and said that the telephone industry, for the most part, is not aware of the fact that it can, by direct effort, "affect demand itself." Desire for service can be created, he said, not always because it is a service, but frequently because it offers prestige, style, convenience and possibly a novelty to the consumer.

He cited the color telephone, pointing out that since it offered no better service than a black instrument, elements such as style and prestige had to be responsible for the demand. Another point Professor Bursk asked the group to remember is that perseverance is an essential of successful selling. Studies reveal, he claimed, that 60 per cent of the sales are made on the fifth contact with the prospect.

William P. Stilwell, assistant director of the University of Wisconsin's Management Institute, and professor of management, addressed the workshop on the subject, "Finding Time to do the Job."

Ben F. Smith, (left) general merchandising manager of Southwestern Bell Telephone Co., leading discussion at opening session of Wisconsin State Telephone Association's Telephone Merchandising Workshop held in Madison Sept. 15-17.

The best way to find time, according to Professor Stilwell, is to detail activities, then analyze them and judge which are the "musts," the "shoulds" and the "cans." The "musts" are to be accomplished, come what may; the "shoulds" are important but not vital, and the "cans" may be set aside without harmful effect.

He said that people in managerial capacities are not able to do everything and must learn to concentrate on the important matters. Planning, willpower and routinizing of tasks are the tools to use. Delegation of authority and work is a characteristic of a good executive, and tasks that can be accomplished by a subordinate, as well as they can by the executive, should be delegated.

The seminar attracted men from three states. Representatives of two Illinois and two Minnesota telephone companies attended, and 17 Wisconsin companies sent enrollees. Registration fee was $122.50, which included study material, lodging and board.

A six-man committee consisting of representatives of Wisconsin Independent telephone companies worked with the university in arranging the seminar.

They are: Paul R. Parsons of Rhinelander Telephone Co., D. H. Hansen of La Crosse Telephone Corp., J. M. Keating of Thorp Telephone Co., George F. Griffin, Amery Telephone Co., and Donald W. Busse and Donald Schumacher, both of General Telephone Co. of Wisconsin.

Wisconsin Association Secretary Ray J. Riordan, speaking for the committee, stated that the group will meet shortly to appraise the September seminar and plan for future workshops.

Merchandising Aid

"Bring Our Customers Back" by Ralph B. Ehrlich (TELEPHONY, Sept. 19, p. 34) was so replete with ideas for rendering the ultimate in telephone service in hotels that we have held the type to reprint it in quantity for those Independent companies who see this article as a useful selling tool.

We believe this piece by Mr. Ehrlich, manager of the Dow Hotel, Freeport, Tex., could be helpful as a brochure to lay before a hotel or motel manager while giving him a sales talk aimed at convincing him to install modern and adequate telephone service. And then, of course, the brochure would be left for him to mull over.

If we have sufficient demand by Dec. 1 to warrant reprinting, we'll proceed, and then mail this four-page merchandising aid within several weeks.

Operate Telephone Service Across Libyan Desert

Libya has installed a tropospheric scatter radio-telephone communications system capable of immediate contact up to distances of 300 miles.

It links various Libyan cities including Sirte, Tripoli, Benghazi and Derna through 12 transmission stations. The stations, located 200-300 miles apart, act as relay points and are said to be able to span the vast Libyan desert in a matter of minutes.

The project was a joint venture of the Ministry of Communications and the Libyan-American Reconaissance Commission.

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We've reserved a copy of our 1960 P-A-B-X Sales Kit for you! This new kit is a complete merchandising package with everything you need to promote P-A-B-X in your area. Built around promotions successfully used by many independent telephone companies. Includes sales guide, specification sheets, model sales letters, envelope stuffer, sales presentation folders, survey form, sample proposal, and typical contract. Write for your free P-A-B-X Sales Kit.

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- SALES GUIDE
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- MODEL SALES LETTERS
- ENVELOPE STUFFER
- SALES PRESENTATION FOLDERS
- SURVEY FORM
- SAMPLE PROPOSAL
- SAMPLE CONTRACT

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and mail today

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ATTENTION: J. M. Zidlicky, Director of Sales Promotion
Northlake, Illinois

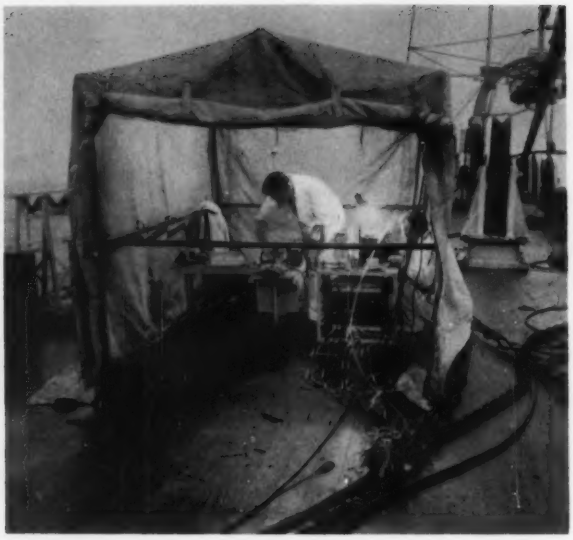
Gentlemen:
Please send me a copy of your new 1960 P-A-B-X Sales Kit.

MY NAME IS_____
PLEASE PRINT CLEARLY

COMPANY NAME_____

STREET ADDRESS_____

CITY_____ ZONE____ STATE_____



LEFT PHOTO: Interior of terminal building at Clarenville, Newfoundland, shows intricate switching and power equipment needed to operate new transatlantic telephone cable system. Teletypewriter machines at right are used to transmit operational messages between Clarenville and similar terminal station at Penmarch, France. Building also houses generating equipment available in event of power failure. RIGHT PHOTO: Final splice of transatlantic telephone cable system was made aboard cableship Monarch off Sydney Mines, Nova Scotia. Technicians in tent on deck of vessel carefully joined a shore-end section of cable at Sydney Mines to cable just placed across Cabot Strait from Terrenceville, Newfoundland. Splice was x-rayed three times to insure a perfect joint and to locate any foreign matter that might have worked its way into the joint.

First Direct North America–Europe Telephone Cable System Inaugurated

THE FIRST telephone cable system to link North America directly to the mainland of Europe was cut into service on Sept. 22 in a ceremony participated in by dignitaries on both sides of the Atlantic.

The new, high fidelity system handled the first calls to Paris over a 4,400-mile route with the ease and clarity of a connection across town, the Long Lines Department of American Telephone & Telegraph Co. reported. The brief conversations that marked the opening of the system for public use were no more than an exchange of pleasantries among government officials and the partners to the 40-million-dollar enterprise.

However, Long Lines observed, behind the words lay the little known story of the ships and men who fought the perverse Atlantic to get the cable system working.

Frederick R. Kappel, president of AT&T, which owns 64 per cent of the new system, said he could "never adequately describe" the successful effort that had been made to open the cable system on schedule.

"Hundreds of men and women on both sides of the Atlantic worked for two years without let-up to make this day possible," Mr. Kappel said. "It is a proud day indeed for all of us in the communications industry."

Although Mr. Kappel didn't mention it, the deep-sea segment of the system was begun Mar. 14, much earlier in the spring than ever before attempted in the 102-year history of transatlantic cable laying. As a result, the moody and often turbulent North Atlantic constantly threatened operations.

On two occasions, laying was halted —once by huge ice fields that had formed off the coast of Newfoundland and again when fire razed one of the two cableships engaged to do the job, forcing all hands to abandon ship some 600 miles west of the French coast.

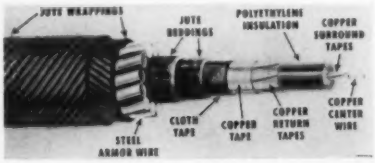
The new cable system is owned by AT&T, the French Ministry of Posts & Telecommunications, and the German Federal Ministry for Posts & Telecommunications. It can carry 36 simultaneous conversations. Techniques now under development, however, should approximately double its capacity.

The system connects the telephone networks of the United States with those of France, Germany, Belgium, The Netherlands, Switzerland and Italy. Through the European points, 36 additional areas and countries can be reached via the cable route.

Twin cables make up the deep-sea

(Continued on page 48)

Example of vacuum tubes used in the repeaters.



Twin submarine cables (cutaway detail shown) comprise new transatlantic telephone cable system. One cable is used to transmit speech east-to-west, the other west-to-east. Specially constructed repeaters were built into each cable every 44 miles to amplify speech.

Head sheave can be extended hydraulically ... to set longer poles or to accurately spot transformers

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HYDRAULIC DERRICK with "EARTH-MASTER" Hydraulic Digger

Handles the complete pole-setting job ... in less time with less manpower

Out on the line, this derrick and digger combination digs a hole up to 20" in diameter, sets a pole up to 70' long—does the work so accurately, so effortlessly that it takes only three men to do the complete job in record time.

Every operation is fingertip controlled ... fully-powered, positive and precise ... with infinite spotting positions throughout an operating arc of more than 200 degrees.

Derrick is rated at 8,000 lbs. It body-loads, lowers to 18" above ground and furnishes more-than-ample down pressure for difficult digging work.

Standard sizes are available for handling 40', 55' and 70' poles. Addition of optional hydraulic head sheave extension substantially increases size of poles which can be handled.

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Series DF-1 "Earth-Master" Hydraulic Digger digs holes up to 20" in diameter, 10' in depth.

Guided-auger Series EM "Earth-Master" digs up to 30" in diameter and 10'6" in depth ... vertically and at angles.

Courts and Commissions

Miss. High Court Rules S. Bell Must Refund $9 Million

The Mississippi Supreme Court on Sept. 28 refused to reverse its decision that the Southern Bell Telephone & Telegraph Co. is not entitled to a 2.5-million-dollar increase (TELEPHONY, July 25).

The ruling means that the company's subscribers are entitled to about 9 million dollars in refunds representing the increased rates collected since July 1956 plus 6 per cent interest. The company says that its earnings without the increase will be 4.96 to 5.08 per cent.

The supreme court overruled a suggestion of error filed by the company following the court's decision last July in which it upheld the action of the Mississippi Public Service Commission in denying the increase in rates.

The commission ruling said that the company was earning a fair return on its investment before the new rates were put into effect.

Norman Johnson Jr., chairman of the commission, stated that the company must repay money owed subscribers by check rather than by crediting subscriber's future bills.

C. L. Lott, Southern Bell vice president, said that in addition to making the refunds the company will backbill subscribers who received reduced rates in changes under the 1956 revision.

The backbilling, involving about 80,000 subscribers, will total about 1 million dollars.

Mr. Lott pointed out that "for the long term, we view our present situation with serious concern. Although we are most anxious to continue providing for Mississippi's growing telephone needs, the commission's order places severe restrictions on our ability to do so.

"After all, this order provides for earnings of only 4.96 to 5.08 per cent, whereas the cheapest form of long-term capital available for expanding or improving service—that is capital raised through the sale of bonds—today requires interest of 5½ per cent or more . . .

"We are having to pay 1959 prices for wages, material, capital and other items that enter into the cost of furnishing telephone service, while being required to charge rates based on conditions existing more than seven years ago. We cannot ignore the effects of these seven years of inflation . . ."

Commission Chairman Johnson said, "Our case was decided on debt ratio. We maintained that securing financing by issuing common stock was too expensive and that the company could operate more economically by issuing bonds to raise money."

He said this was the first test case under the Mississippi Public Utilities Act of 1956, which law gave the commission more money to hire legal aid and rate experts to study the financial structure of utilities.

Allow SE Company 6.58 Rate of Return in Florida

The Southeastern Telephone Co., Tallahassee, was authorized by the Florida Railroad & Public Utilities Commission on Sept. 25 to raise rates to permit the company an additional $585,195, about $289,000 less than the amount originally requested (TELEPHONY, Aug. 29).

Southeastern had claimed that it needed a rate of return of 7.12 per cent in order to borrow at a low interest rate. To give the company these earnings, a rate increase of $874,614 would have been necessary.

The authorized increase will produce a 6.58 per cent rate of return on the rate base of $8,990,406.

In 1958, the commission authorized the company to put interim rates into effect which did produce the $874,614. This order was later rescinded and the case went through several hearings and court proceedings.

In the most recent decision, the Florida Supreme Court nullified the temporary increase and the matter was returned to the commission for a decision on the permanent increase.

The company must refund by Dec. 15 about 1 million dollars collected under the temporary authorization.

Seeks to Charge Use Tax To Local Subscribers

The Nebraska Railway Commission on Sept. 30 was asked by the city of Scottsbluff to hold a hearing on a proposal of the United Telephone Co. of the West to add 80 cents to telephone charges to compensate for a $3,600 occupation tax assessed against the company by the city.

In a previous order the commission had granted the company permission to do this.

City Attorney Loren Olsson contended that the addition amounted to a rate increase and that no such increase could be authorized without a public hearing. The city also contends that if such an addition in rates is made, it should apply to all subscribers served by the company, not just those in Scottsbluff.

Virgin Islands Approves Sale of System to ITT

Improved and expanded communications service between the Virgin Islands and the rest of the world was forecast on Oct. 1 by the International Telephone & Telegraph Corp., which is acquiring the Islands' government-owned telephone system. The Islands' Legislature on Sept. 30 approved sale of the system to ITT on recommendation of Gov. John D. Merwin.

An ITT spokesman said a corporation, probably to be called the Virgin Islands Telephone Corp., would be formed to operate the system.

He said ITT will begin immediately to improve the 2,000-line system now serving some 3,000 manual telephones on the islands of St. Croix, St. Thomas and St. John. Engineering for conversion to dialing will be started immediately.

The sale of the system was voted last year by the legislature, which empowered the governor to solicit bids. Twenty-five bids were received.

Employes of the telephone system who wish to remain will be employed by the new company, the ITT spokesman said. Islands' residents will be

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Here is your opportunity to join an expanding organization devoted to design and development of specialized microwave and carrier multiplex systems for communications and data handling

If you are experienced in toll transmission engineering or telephone plant equipment engineering, you may qualify for challenging positions in Collins new and modern engineering laboratory in Dallas, Texas.

Collins present expansion program in microwave and telephone equipment research and development provides exceptional opportunity for your continued professional advancement.

Electrical and mechanical engineers at all experience levels are needed for the following:	Systems engineers for design and development of microwave and carrier multiplex systems with applications in radar relay, multi-channel telephone communications and TV links.	Design and development engineers for research and development of microwave and carrier multiplex equipment.
	Equipment engineers for application and collateral engineering liaison between engineering, manufacturing and installation.	Technical writers for preparation of instruction books, operating manuals, maintenance manuals.

USITA INTERVIEWS: Mr. Ben E. Jeffries, Manager of Technical Employment, will be in Chicago during the USITA show to interview interested applicants. For more information or an interview appointment, call Mr. Jeffries at WAbash 2-7992 between 9:00 a.m. and 8:00 p.m. October 12 and 13, or between 9:00 a.m. and 2:00 p.m. October 14. Or, send your resume in confidence to Mr. Jeffries at the address below.

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COLLINS RADIO COMPANY, 1930 HI-LINE DRIVE, DALLAS, TEXAS • CEDAR RAPIDS, IOWA • BURBANK, CALIFORNIA

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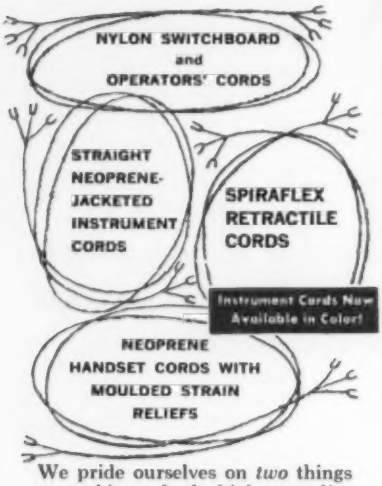
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Instrument Cords Now Available in Color!
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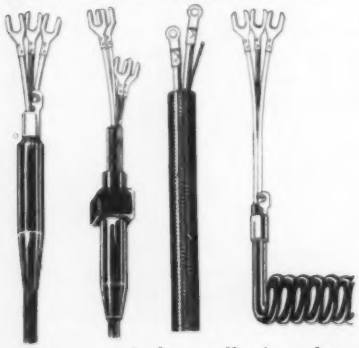
We pride ourselves on *two* things . . . making only the highest quality cords—and, making prompt deliveries . . . a combination which spells complete *customer satisfaction!* Why not give us the opportunity to prove these points to you.



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elected to the board of directors of the new company.

A new submarine cable being installed between Puerto Rico and the United States by Radio Corp. of Puerto Rico, and additional radio channels between the Virgin Islands and San Juan, Puerto Rico, being established by All America Cables & Radio, Inc., both ITT subsidiaries, will be utilized to give the Islands the most modern local and overseas communications service, ITT stated.

The bid evaluation board recommended unanimously to Governor Merwin that the ITT proposal be accepted. The bid was for $450,000 and guarantees no increase in existing rates for one year. ITT estimated in its proposal a demand for 8,800 telephones by 1964 at a cost of more than 2 million dollars.

Telephones were installed there in 1906, when the Islands were still owned by Denmark. The government has operated the system for 42 years.

Initial ITT plans provide for construction of a building at Charlotte Amalie, where commercial and administrative offices as well as future dial and switching requirements would be centered. Other buildings for the system would be erected at Christiansted and Frederiksted, both on St. Croix.

Ask Sale OK in Kansas

The Border Telephone Co., Syracuse, on Sept. 11 petitioned the Kansas Corporation Commission for permission to sell to the Pioneer Telephone Association, Inc., Ulysses, according to Ray Jackson, owner of the Border company.

Two Financing Approvals Given in North Carolina

The Heins Telephone Co., Inc., Sanford, was authorized by the North Carolina Utilities Commission on Sept. 29 to distribute 1,140 shares of its $100 par value common stock as a stock dividend, on the basis of one share for each of the 1,140 shares already held (TELEPHONY, Sept. 26).

The amount will be charged to the company's unappropriated earned surplus account. The commission noted in its order that the company paid only one cash dividend, of $57,000, from the time it was organized in 1931 to 1954.

•

In another action, the Mooresville Telephone Co. was authorized by the commission on Sept. 29 to sell $301,000 of 5¾ per cent first mortgage bonds to the Durham Life Insurance Co. of Raleigh, N. C.

Two Ask To Sell in Nebraska

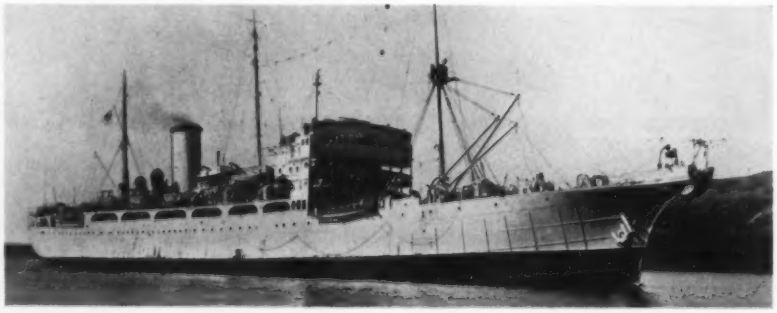
A hearing has been set by the Nebraska Railway Commission for Nov. 4 on the applications of the Upland Telephone Co., and the Campbell Telephone Co., to sell to the Glenwood Telephone Membership Corp., Blue Hill. A change in rates is also sought.

FIRST NORTH AMERICA-EUROPE TELEPHONE CABLES

Continued from page 44

portion of the system, which stretches across the bottom of the Atlantic between Clarenville, Newfoundland and Penmarch, France. On this continent, the circuits are contained within a single cable that traverses Newfoundland, then crosses Cabot Strait to Nova Scotia. From there they extend southward over a radio relay system to Portland, Me., and the U. S. network.

This cable is similar in design and construction to the first transoceanic telephone cable, which was laid from Newfoundland to Scotland in 1956. The next year there were 227,000 calls between the U. S. and Great Britain, an



Monarch, world's largest cableship, was one of four vessels employed in laying of 40-million-dollar transatlantic submarine telephone cable system between Newfoundland and France. Ship is 480 feet long and has gross tonnage of 8,060.

increase of 67 per cent over the 1956 total. And transatlantic calls to mainland Europe had increased from 282,000 in 1956 to 340,000 in 1957. The heavy demand for this telephone service prompted the construction of the new cable system to France, AT&T officials said.

In addition to Mr. Kappel, Henry T. Killingsworth, AT&T vice president in charge of Long Lines, and John C. Doerfer, chairman of the Federal Communications Commission, spoke over the new cable from New York.

Speaking from Paris were: Monsieur Cornut-Gentille, the French minister of posts and telecommunications; Herr R. Stuecklen, German minister of posts and telecommunications; Herr F. Gladenbeck, German director of posts and telecommunications, and Monsieur Robert Croze, French director general of telecommunications.

REPEATER APPLICATIONS

Continued from page 22

Smaller from Larger
19.0 - 6.4 = 12.6 DB
Value of F for 12.6
(Table 1) = 0.2 DB
F from Smaller
= RL_a
= 6.4 - 0.2 = 6.2 DB

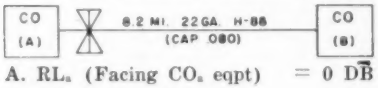
Since this is an exact midpoint repeater, $RL_a = RL_b$

B. Refer to *Fig. 1* to determine maximum AT-2 repeater gain
(RL_a = 6.2 DB
RL_b = 6.2 DB) = 3.2 DB

Note that an AT-2 can supply more gain when used in an intermediate location.

Example 3

Terminal AT-23 Repeater in Loaded Facility
(Using same facility as Example 1)



A. RL_a (Facing CO_a eqpt) = 0 DB

B. Calculation of RL_b
(1) Two times attenuation
(Table 2) 2 x 6.4 = 12.8 DB
(2) Structural
Return Loss = 19.0 DB
(3) Combine (1) and (2)
on an *Energy Summation Basis* (Table 1)
Smaller from Larger
19.0 - 12.8 = 6.2 DB
Value of F for 6.2
(Table 1) = 0.9 DB
= RL_b
= 12.8 - 0.9 = 11.9 DB

C. Refer to Fig. 3 to determine the maximum AT-23 repeater gain.
(RL_a = 0 DB
RL_b = 11.9 DB) = 4.3 DB

Note that an AT-23 gives approxi-

you expect more from a specialist ...you get more from

ALPHADUCT DROP WIRE

COMPARE Alphaduct with any other telephone drop wire! None can offer you a better balance of the physical and electrical properties necessary for dependable, long-life communication service.

EXHAUSTIVE TESTING:
TANK TESTS—every coil of Alphaduct is submerged in water for voltage breakdown and insulation resistance tests.
COMPRESSION TESTS—Alphaduct drop wire is manufactured to withstand exacting crush resistance tests.
P-CLAMP TESTS—insures superior bonding of rubber to conductor and jacket to insulation...simulates field conditions.

EXCLUSIVE DATING FEATURE—every length of Alphaduct carries manufacturer's name, catalog number and date of manufacture...provides permanent service record of installation...proves Alphaduct's long-lasting durability.

CARTON PACKAGING—provides ease of handling... protects products during shipment and storage... simplifies inventory counts.

AVAILABLE IN THREE CONSTRUCTIONS (in both reinforced and non-reinforced) Twisted Pair, Parallel Type, and Dumbbell Type.

When you buy Alphaduct Drop Wire or any one of Alphaduct's complete line of telephone wires—you buy the know-how of the only real independent specialists in the insulated telephone wire field.

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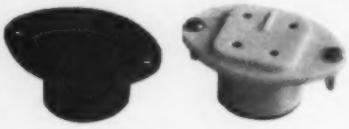
SUTTLE

TOP VALUES



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NEW Outdoor Weatherproof Jack Boosts Revenues!

Subscriber demands for outdoor, backyard, or patio telephone service are growing fast. The new SE16151 Outdoor Weatherproof Jacks from SUTTLE "fill the bill" for every outdoor use. The non-corrosive, waterproof, aluminum receptacle houses the SE493A jack (above). This new jack makes an excellent extension sale-revenue booster. Another SUTTLE *quality* product at low cost. Order from SUTTLE or your distributor.

Price $6.50 each

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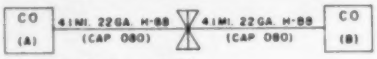
mately 4.3 DB - 2.8 DB = 1.5 DB more gain than a single AT-2 in this terminal application.

Example 4

Intermediate AT-23 repeater in Loaded Facility
(Using same facility as Example 2)



A. Calculation of RL_a
- (1) Two times attenuation (Table 2) 2 x 3.2 = 6.4 DB
- (2) Structural Return Loss = 19.0 DB
- (3) Combine (1) and (2) on an *Energy Summation Basis* (Table 1) Smaller from Larger 19.0 - 6.4 = 12.6 DB
  Value of F for 12.6 (Table 1) = 0.2 DB
  F from Smaller = RL_a = 6.4 - 0.2 = 6.2 DB

B. Since this is an exact midpoint repeater
$RL_a = RL_b$

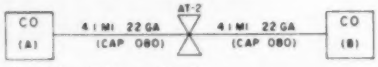
C. Refer to Fig. 3 to determine the maximum AT-23 repeater gain. (RL_a = 6.2 DB RL_b - 6.2 DB) = 4.7 DB

Note that it is possible to obtain 4.7 DB of gain from a midpoint AT-23 repeater as compared to 4.3 for terminal applications, however, the next gain step above 4.3 on an AT-23 is 5.0 DB.

A gain step above a maximum value is not advisable, consequently the 4.3 DB step would also be used in this case.

Example 5

Intermediate AT-2 repeater in *Nonloaded* Facility



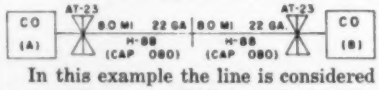
A. Calculation of RL_a
2 x Effective Loss 7.38 (Table II) 2 x 7.38 = 14.7 DB

B. Calculation of RL_b
2 x Effective Loss 7.38 = 14.7 DB

Refer to *Fig. 1* to determine the maximum *effective* gain that can be obtained with an intermediate AT-2 in a nonloaded facility.
(RL_a = 14.7 RL_b = 14.7) = 8.5 DB

Example 6

Two terminal AT-23 repeaters in Loaded Facility



In this example the line is considered as cut in two, and the total attenuation should be considered as = 1.1 times the facility loss.

A. Calculation of RL_a
- (1) Two times attenuation (attenuation = 1.1 x 6.24 = 6.86) 2 x 6.86 = 13.8 DB
- (2) Structural Return Loss = 19.0 DB
- (3) Combine (1) and (2) on an *Energy Summation Basis* (Table I) Smaller from Larger 19.0 - 13.8 DB = 5.2 DB
  Value of F for 5.2 (Table I) = 1.1 DB
  F from Smaller = RL_a = 13.8 - 1.1 = 12.7 DB

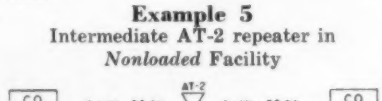
B. Refer to *Fig. 3* to determine the maximum gain of each repeater (RL_{a_0}=0 RL_b=12.7) (RL_{b_0}=0 RL_a=12.7) = 4.6 DB

The sum of both repeaters would furnish 9.2 DB of gain applied in this manner. Since there is no 4.6 gain step, it would be possible to set one repeater to 4.3 DB and the other to 5.0 DB. At these levels crosstalk limits would still not be exceeded.

If a single AT-23 repeater is used in this circuit as a terminal repeater the maximum gain that should be used would be 6.5 DB because of crosstalk considerations. If a single AT-23 repeater is used at a midpoint location the maximum gain obtainable would be 8.9 DB, therefore, 2 AT-23 units as terminal repeaters at each end of the line will produce a slight increase in gain.

Example 7

Intermediate AT-2 repeater on Special Service Line with Loaded and Nonloaded facility.



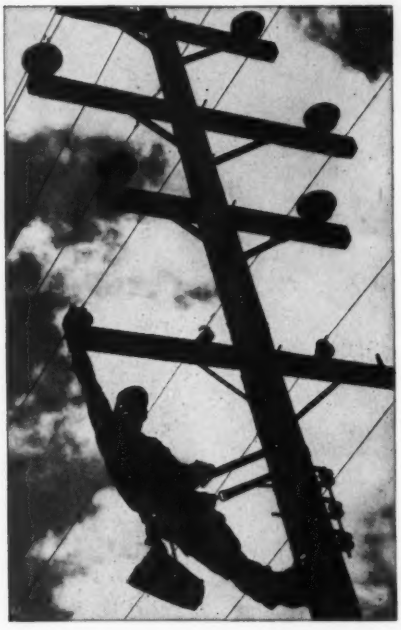
A. Calculation of RL_a
- (1) Two times attenuation 2 x 3.08 = 6.16 DB
- (2) Structural Return Loss = 16.0 DB
- (3) Combine (1) and (2) on an *Energy Summation Basis* (Table I) Smaller from Larger 16.0 - 6.16 = 9.84 DB
  Value of F for 9.84 (Table I) = 0.4 DB
  F from Smaller = RL_a = 6.16 - 0.4 = 5.76 DB

B. Calculation of RL_b
2 x 4.064 = 8.128 DB

Refer to *Fig. 2A* to determine the maximum effective gain that can be obtained in this example
(RL_a = 5.76 DB RL_b = 8.128 DB) = 3.1 DB approximately

(The End)

How can you string telephone lines faster?



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Because the high-tensile characteristics of Amertel 195 make possible longer spans than other telephone wires, work is speeded up. There are fewer holes to dig, fewer poles to set, less hardware to install. Mile after mile, lines strung with this bonus wire go up faster—more economically.

The use of USS Amertel 195 pays off in other ways:

- Amertel 195 has extra low resistivity, resulting in better voice transmission at relatively high frequencies.
- Amertel 195 is easy and economical to string over rivers and gullies.
- Severe weather conditions will not damage it. Heavy ice may weight it down, but will not break it.
- Existing rural power poles may be used to string telephone lines without need for additional supporting poles.

For more information, write to American Steel & Wire, Dept. 9185, Rockefeller Bldg., Cleveland 13, Ohio. We'll gladly send you our new, free booklet on Tiger Brand Amertel 195.

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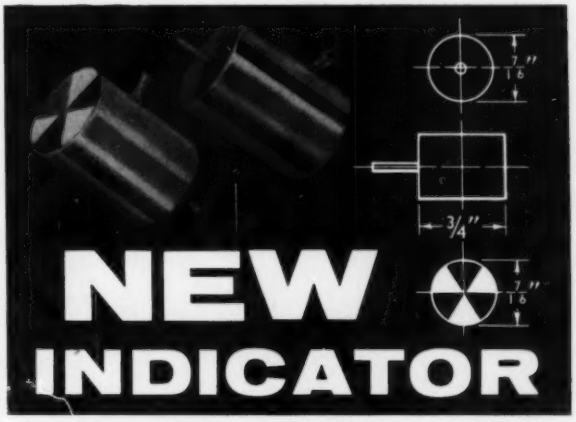

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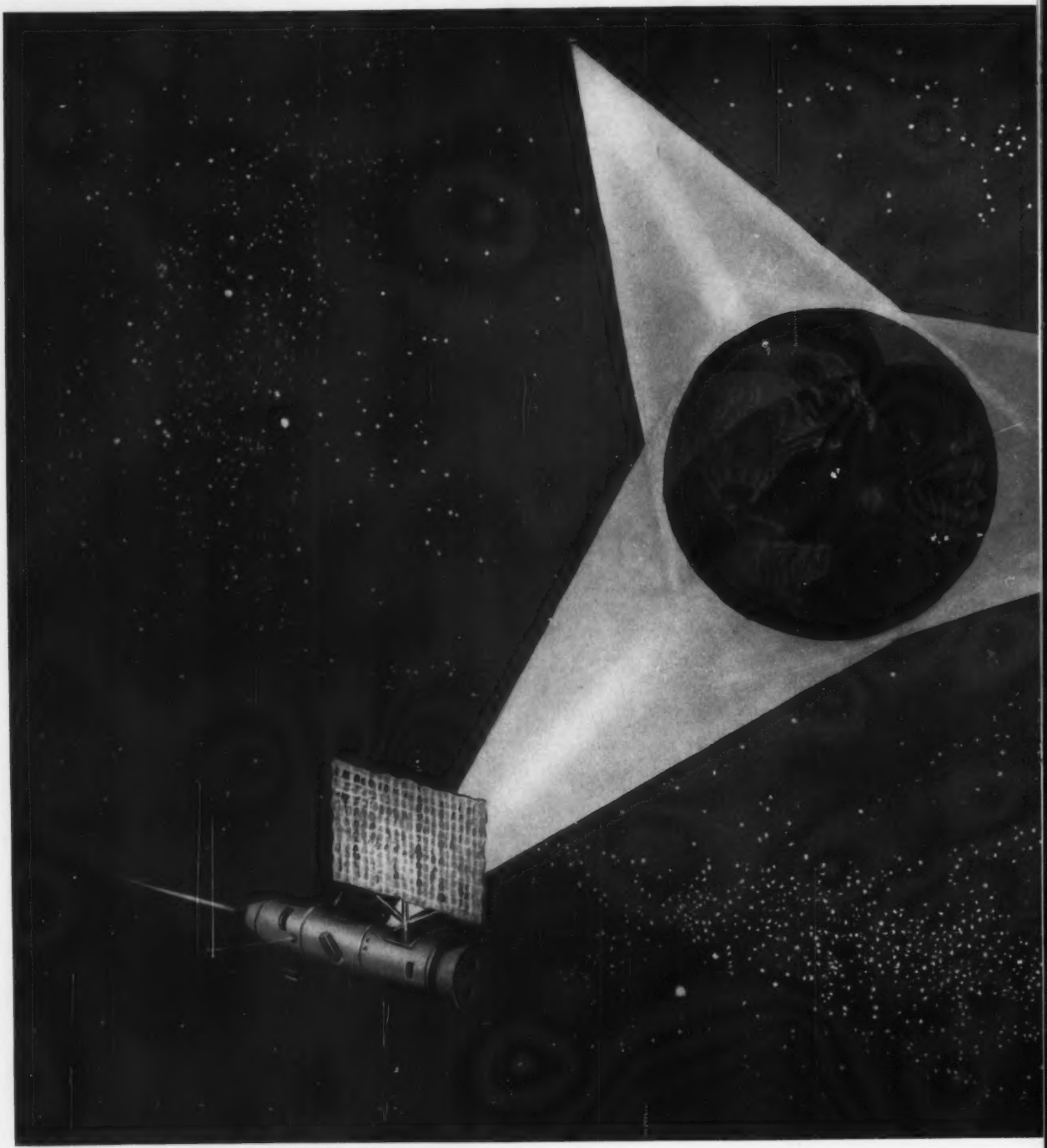
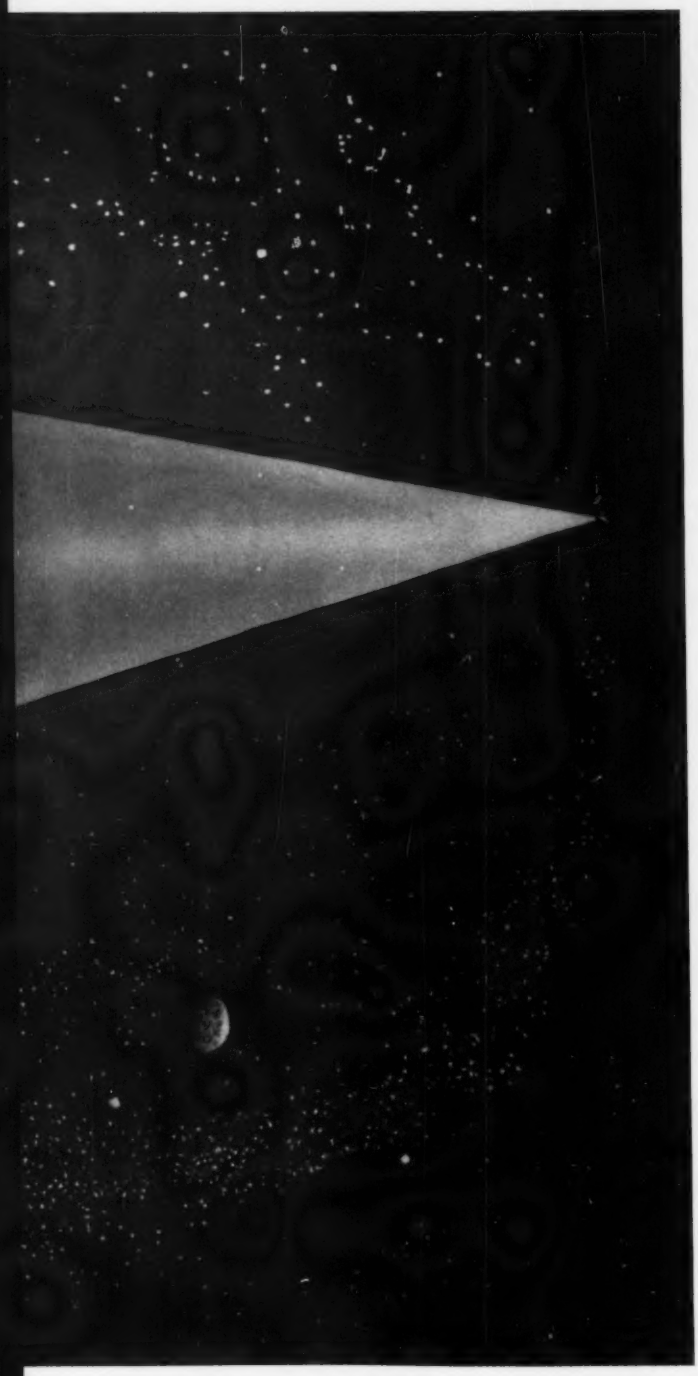


ITT's "Earth Net Dialing" system for global telephone calls via satellite relay.

for the expanding role of Telephony



ITT *Laboratories is now developing the "advance guard" of tomorrow's satellite relay system for world-wide communication and telephone dialing*

A VAST new dimension—reaching to outer space—is being created for telephony, to help relieve the world's overtaxed communication resources.

Satellite and earth-moon-earth relay communication systems that will play a vital part in shaping this new dimension are under development at ITT Laboratories, a growing research center in Nutley, New Jersey.

One of ITT's advanced concepts for speeding tomorrow's increased voice, video, and message traffic is the "Earth Net Dialing" system—a network of three unmanned satellites, 120 degrees apart in an equatorial orbit 22,300 miles in space.

With signals from each satellite blanketing almost half the earth—each overlapping the other—and working through appropriate ground networks, it would be possible to establish world-wide telephone dialing and other types of modern communication.

"Earth Net Dialing" and other ITT space-age communication programs do more than foretell the coming of a new dimension for telephony.

They symbolize the "years ahead" thinking and creative research that have made ITT's Kellogg Switchboard and Supply Company a valued contributor to the progress of independent telephony for 62 years.

New research addition at ITT Laboratories, Nutley, N. J.

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Obituaries

MISS LEOLYNN SNEED of Keytesville, Mo., died at Woodland Hospital, Moberly, on Sept. 16.

Recently retired, Miss Sneed had been employed by the Western Light & Telephone Co., Inc., in Keytesville as cashier and chief operator for more than 38 years.

She was well known in the telephone industry, and had served as a director of the Theodore Gary Chapter, Independent Telephone Pioneers of America.

•

NOEL RICE, formerly manager of the Ironton-Arcadia Telephone Co., Ironton, Mo., died on Sept. 27.

Mr. Rice had been in ill health for some time and recently disposed of his telephone interests.

He was a charter member of the Theodore Gary Chapter of the Independent Telephone Pioneer Association, and at one time, served on its board of directors.

•

VISCHER ALONZO RANDALL, 81, died at Omaha, Neb. on Sept. 26. He was a retired engineer of The Lincoln (Neb.) Telephone & Telegraph Co. and was associated with the Bell System for many years.

Mr. Randall was employed by Long Lines of AT&T in 1901 in New York and transferred to the New York Telephone Co. as an inspector in 1902. Later he was a wire chief, special agent, supervisor of maintenance and equipment inspector before moving to Chicago in 1908 with Long Lines.

There he supervised the installation and cut-over of the Washington Street toll exchange of AT&T, and returned to New York in 1912 as maintenance and transmission supervisor.

In 1922 Mr. Randall became the pioneer announcer and studio director of Radio Station WEAF, New York, which at that time was operated by AT&T. The station was later purchased by RCA and he moved to Lincoln, Neb. where he became associated with Lincoln T&T in 1928. He served as foreign wire relations engineer until his retirement in 1933.

In 1944, during World War II, the Lincoln company recalled him to service as an engineer and he was instrumental in designing and manufacturing a small, compact answering wall telephone from spare parts. LT&T used this for several years during the period of equipment shortage caused by the war. Randall retired the second time in 1946.

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KEARNEY
Products
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Born at Chardon, Ohio, Randall attended the public schools at Akron and graduated from the University of Michigan.

IN THE NATION'S CAPITAL

Continued from page 18

our jobs. If Japan can land steel on the Pacific Coast at $20 a ton cheaper than American mills, if Belgium can bring steel up the St. Lawrence to Cleveland $20 cheaper, if oil companies can build tankers in Japan at great savings in cost over American shipyards, if Japan can buy logs in the Philippines, take to Japan and make into plywood and ship to the United States cheaper than we can make plywood from our own native woods, if Monroe Calculating, Royal Typewriter, and Remington-Rand can build office equipment in Europe and ship to the United States cheaper than it can be manufactured here, we have something to worry about . . ."

As a matter of fact, some American non-utility companies are finding it economical to avoid increasing domestic expenses by manufacturing abroad, especially products to be sold in the world market. So, instead of using American labor and American materials, and paying taxes to the federal, state and local governments of the United States, they are erecting factories in Germany, France, England, Ireland, Italy, and elsewhere, exporting American capital for that purpose. They cannot compete in any other way with cheap foreign labor and other expenses for world trade.

But, a public utility cannot run away from its strictly domestic burdens, and if it is denied or restricted in its right to state its case about such burdens, the burdens become that much more oppressive. Whenever American business goes abroad, the principal sufferer is the American worker who is forced to live in a war economy, or face possible unemployment, resulting from pricing himself out of the market otherwise available for world trade. In plain words, capital can be exported—non-regulated capital that is—but the worker cannot export his job.

For utilities, at least some degree of balance might be struck in returning to management the traditional discretion of determining what expenditures should be made for business operations, including protective publicity. A regulatory commission or an Internal Revenue Commissioner should have no more right to tell public utility management how to spend company funds on business operations than they should have the right to tell the labor union to stop spending money for advertising—unless there is some question of fraud or irregularity or excessive expendi-

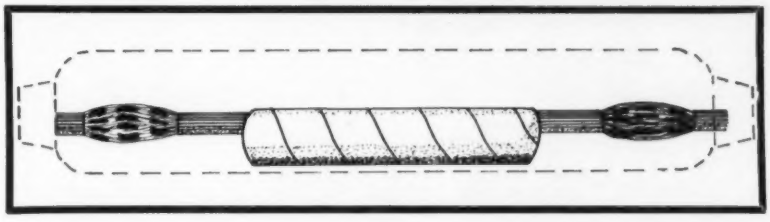
CEECO LOADING COILS

Units for Splicing Mounting

These assemblies are supplied on a wooden dowel, sometimes called sleeve mounted for use in the cable splice.

TYPE 162 FOR MOUNTING IN PLASTIC CABLE SPLICE

Type 162 assemblies can be supplied containing from one to 16 coils of either Type 632(88MH) or Type 638(44MH) and are for use in plastic cable splice. Types MF10, MF11, 641 and 642 coils can be furnished for inter office and toll entrance cables.



TYPE 167 FOR MOUNTING IN LEAD CABLE SPLICE

Type 167 assemblies can be supplied containing from one to 16 coils of either Type 632(88MH) or Type 638(44MH) coils and are for use in lead cable splice. Types MF10, MF11, 641 and 642 coils can be furnished for inter office and toll entrance cables.

CEECO assemblies give "Life like" voice transmission and reception to your long cable and rural distribution wire circuits. "Life like" telephone transmission is a clear, easily understandable telephone conversation over the necessary frequencies present in the voice to be heard via the telephone in the same volume as in "face to face" conversation. Telephone companies providing such quality service will increase subscribers desire to use "LONG DISTANCE" more often, thus increasing revenue.

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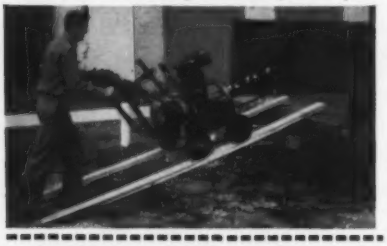

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FCC Ex-Chairman Cleared

The FCC's special examiner, Horace Stern, has reported that no improper influence figured in the 1957 award of TV Channel 5 to Station WHDH in Boston, Mass. WHDH, Inc., is a subsidiary of the Boston *Herald-Traveler.* The examiner, a retired chief justice of the Pennsylvania Supreme Court, noted that there was, therefore, no basis upon which the FCC should set aside its grant to Station WHDH. The decision, in effect, exonerated former FCC Chairman George C. McConnaughey from any irregularity in his relation to the case while heading FCC three years ago.

Charges had been made before the House Legislative Oversight Sub-committee, and in the District of Columbia U. S. Circuit Court of Appeals, that McConnaughey had improperly discussed the case during a luncheon with interested parties. Judge Stern, upholding McConnaughey, contended that there was nothing improper in having lunch as long as the merits of the case were not discussed. Stern further found no evidence of improper *ex-parte* discussion. Stern's examiner report had the status of a recommendation which could become a final commission order in 50 days. The FCC had reopened the case on orders from the U. S. Circuit Court of Appeals to determine whether any pressures were exerted on FCC during the case.

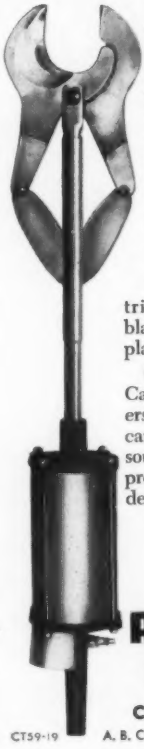
Weird stories about this case broke into the open during the hearings on government agencies by the House Sub-committee on Legislative Oversight. On the basis of the committee testimony, the court of appeals has remanded the case to the FCC for an inquiry into any influence peddling. In hearings before Judge Stern last winter, Choate testified that he twice had lunch with McConnaughey, then FCC chairman, during the Channel 5 proceeding.

But Choate also testified that their conversation had never strayed into the merits of the Channel 5 case. McConnaughey said he frequently had private lunches with TV channel applicants and saw no harm in doing so, so long as there were no pleas for favored treatment. Judge Stern essentially upheld these viewpoints.

"There is not a shred of credible evidence," Judge Stern said, "that there was an attempt there on the part of Choate to present the merits of the *Herald* application." More generally,

CHANCE CABLE CUTTER

Cuts Communications Cable up to a 3¼" diameter in a single stroke!



This *air-powered* cutter, with tempered alloy-steel blades, slices cleanly through lead or plastic sheath cable. Severed cable ends are left smooth and even—ready for splicing.

The Chance Cable Cutter is well-balanced, easy to use. No special skill or experience is required—thumb pressure on the trigger actuates cutting blades. The blades are replaceable.

Chance *air-powered* Cable Cutters, Power Pruners, and Guy Strand Cutters can be operated from many sources—any type of compressor or standard cylinders of dry nitrogen.

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Judge Stern remarked that "mere normal social relations with public officials are not taboo, for they, like other human beings, are not required to live in ivory towers."

The testimony of Forrester A. Clark, vice president of Massachusetts Bay telecasters, that he had seen various public officials about the case in an effort to see that "no political or other improper influence could be successfully exerted by any of the other parties," was accepted as reasonable by Judge Stern. But, he said, Clark "may have stepped somewhat out of bounds" in telling McConnaughey privately about the merits of Massachusetts Bay backers. This was called a "minor" incident.

In addition to clearing all of the applicants of improper conduct, except for the one reference to Clark, Judge Stern found that no member of the FCC "was guilty of any indiscretion, impropriety, misconduct or illegality." The Justice Department had recommended that both WHDH and Massachusetts Bay be disqualified from receiving the channel.

TRANSPORT DIAL C. O.

Concluded from page 33

last June, Bell had no immediate need for the old office. So there it sat, still in good working condition.

Fit the Bill

It was just what Pyote needed . . . only there was the matter of moving it from Anson to Pyote.

The Bigham boys made the move look simple. A baby could have slept in the dial building from Anson to Pyote without being disturbed.

When the building left Anson, Tom Chandler, Bell wire chief at Stamford, Tex., rounded a cycle, too. Chandler was Bell's combinationman at Anson and helped put the dials to work there in 1939. At that time, Warren E. Bray was district plant chief at Abilene and Chandler's boss. Mr. Bray is now vice president and general manager for Southwestern Bell's Arkansas area.

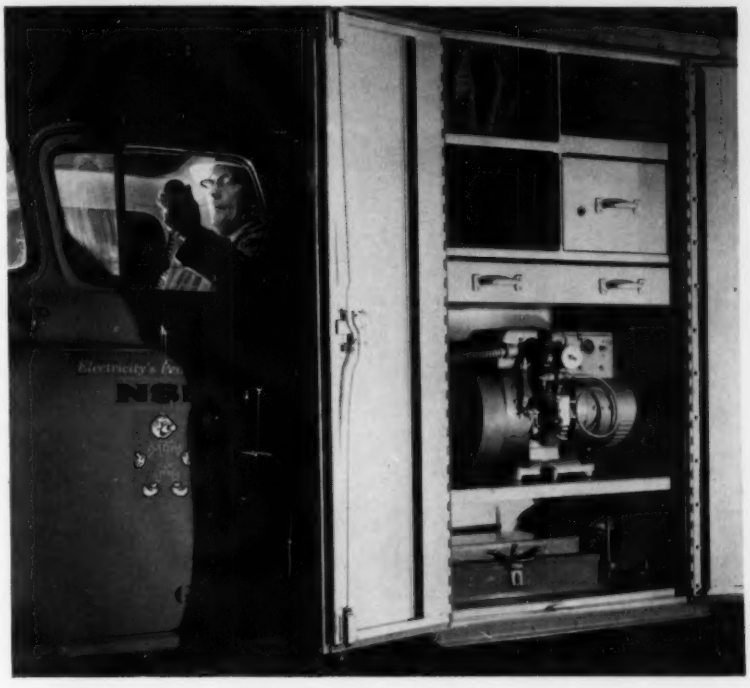
After the move to Pyote was arranged, Chandler came to Anson to batten down the hatches for the trip and see his baby off to serve another town.

"I put her in here," he said. "She's just as good as ever . . . ran a call through her yesterday. All they have to do is hook her up in Pyote and she's ready to go."

Voice of People

"With us, law is nothing unless close behind it stands a warm, living public opinion."—WENDELL PHILLIPS.

Onan NEWS REPORT



Built-in dual-purpose electric plant

delivers 2KW for tools and lights; keeps batteries fully charged, too!

Utility construction and maintenance trucks like this one, use two kinds of auxiliary electric power . . . and the Onan Electric Plant provides both. Workmen can plug in on the plant for 2,000 watts of 115-volt, 60-cycle A.C. to operate electric tools like drills, saws, soldering irons and floodlights. Or the plant will deliver 30 amperes of 12-volt D.C. to handle the battery drain of 2-way radio and battery-powered lights.

The Onan's D.C. output makes it unnecessary to run the truck engine to keep batteries charged, making savings in fuel and engine maintenance totaling hundreds of dollars per year per truck.

Leading body builders now install these dual-purpose Onan plants on new vehicles or you can mount them on vehicles now in service. Onan's Vacu-Flo cooling system permits installation within a closed compartment. Where no space is available in the truck body, the plant can be neatly installed over the cab within a handsome weatherproof steel housing.

Dual-purpose utility models are available with either 1,000 or 2,000 watts A.C. Powered by smooth-running single-cylinder Onan air-cooled gasoline engine.

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Instantaneous standby power for microwave systems. No interruption of any kind of signal. No moving parts. Can be fitted to existing standby installations.

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"Super-Splice"®
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waterproof
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Superior Cable's exclusive economical "Super-Splice" is a plastic splice sleeve. It is sealed at one end and comes to you filled with an insulating and waterproofing compound.*

"Super-Splice" prevents leakage currents and breakdowns in the presence of moisture . . . good for 25,000 v. d. c.

Can be easily removed to re-enter the splice . . . the compound never hardens or oozes out no matter what the temperature.

*A Dow-Corning silicone compound.

"Super-Splice" is available for use with straight, butt or bridge splices.

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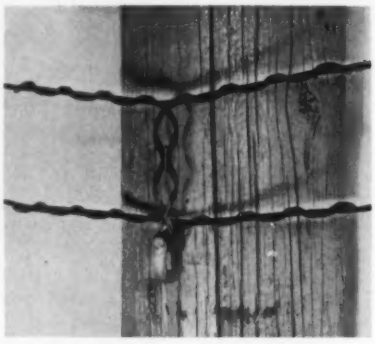
SUPERIOR CABLE CORPORATION
Hickory, North Carolina

News on New Products

ELONGATED LOOP TANGENT SUPPORT—Preformed Line Products Co. has developed a new Elongated Loop Tangent Support to provide an economical means of stringing two lines of one-pair aerial distribution wires (C-Rural), utilizing only one drive hook.

An adaptation of the original Preformed Standard Loop Tangent Support introduced in 1956, the new one-piece design incorporates an elongated loop, which, when slipped over the drive hook, establishes a fixed dimension between lines at the pole, the company states.



The elongated loop tangent support is made of stainless steel. The legs are neoprene-coated to protect the wire from wear and abrasion, states Preformed.

Simple hand installation provides uniformity of application every time, according to the company. Both the new elongated loop tangent support and the standard loop tangent support will hold a *minimum* of 150 pounds in unbalanced loading conditions.

The fittings are immediately available for wire sizes 2 # 14 and 2 # 12 copper-covered steel and 2 # .083 steel. Request NP1197.

•

SMALL CROSSBAR SYSTEMS — In celebration of the 75th anniversary of North Electric Co., the unveiling of the company's newest switching equipment, NX-2 and NX-3 Modular Crossbar is announced by H. C. Ryon, vice president.

Mr. Ryon relates, "These new small crossbar systems will be of special interest to smaller operating companies who envision fast-growing nationwide DDD patterns and are interested in

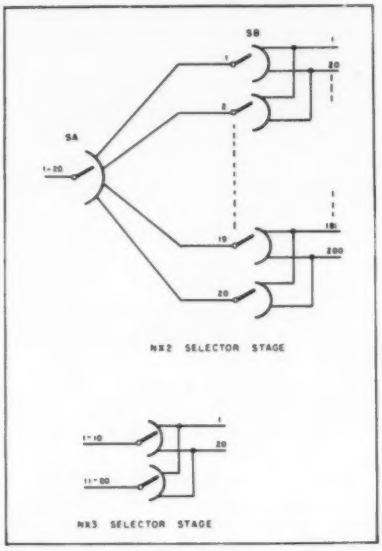


Fig. 1. Difference between NX-2 and NX-3 selector stages.

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP1197_____; NP1198_____; NP1199_____; NP1200_____;
NP1201_____; NP1202_____; NP1203_____; NP1204_____.

Name.....

Company.....

Street.....

Town and State.....

10/10/59

economies in first cost as well as in future additions." He added, "We have included in our design all the provisions for the same efficiency, traffic handling capacity and flexibilities of our larger NX-1 Crossbar."

The new systems are designed to be compatible both economically and technically with the needs of community dial offices in the range of 30 to 3000 lines. The wide range in capacity has been accomplished by the use of two different types of selector arrangements. The NX-3 selector used in switchboards up to approximately 200 lines is a single stage arrangement, while the NX-2 selector is arranged in two stages using the link connection principle. (See *Fig. 1.*)

The systems use registers for receiving, analyzing and storing of the dialled number, giving flexibility in numbering and greater simplicity of the switching circuits.

For calls terminating locally, the register stores the whole directory number. For calls directed to other offices, North states, the register receives only the digital information necessary for the connection through the selector stage. Remaining digits are sent to the distant office under direct control of the subscriber's dial.

The switching stages consist of line finder, connector and selector all using the same type of crossbar switches with 10 verticals and six horizontal bars. Basically, each vertical is used as a separate switch with 20 outlets as selector and 30 circuits as line finder and connector units. A method of grading verticals is used in order to obtain required multiple capacity.

The systems can be arranged for Terminal-Per-Line (TPL) or Terminal-Per-Station (TPS). In both cases the same type equipment and trunking are used with the exception of number group equipment which is added when terminal-per-station arrangement is required. This makes a conversion from TPL to TPS very simple and economical, the company states.

The line finder and connector multiples have a maximum capacity of 90 lines per line group. The capacity is obtained by connecting three 30-line groups together. Switchboards not larger than 90 lines including trunks can be arranged without selectors by connecting line finders and connectors back-to-back.

Offices with more than one line group require a selector stage. This stage is expandable in increments of 20 outlets for the NX-3 system and in increments of 200 outlets when used in the NX-2 system. Either addition can be accomplished by adding pre-wired crossbar

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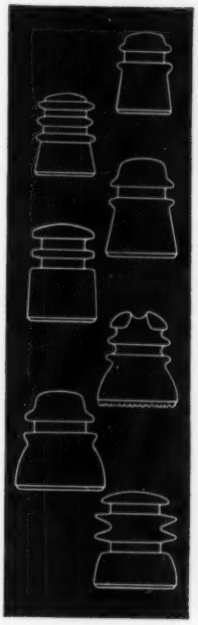

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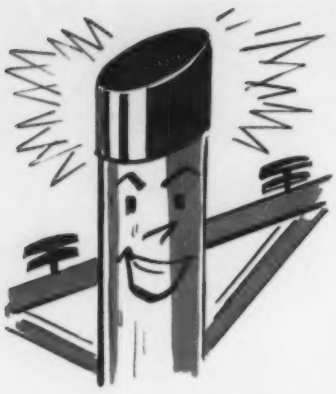

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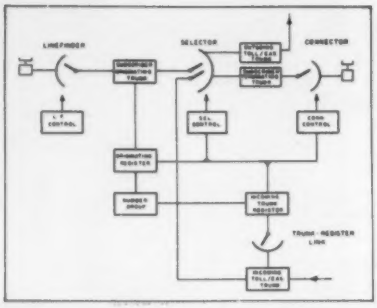

Fig. 2. Simplified trunking diagram of NX-3 system.

switch units on a parallel basis to the switching stage. North states, this eliminates the necessity of introducing a second selector stage and rearrangement of existing grading and cross connections.

Other standard features in the system, according to the company, are as follows:

Ten-party line service with full selective ringing.
100 per cent lock-out.
Fifteen PBX lines per 90 line group with no consecutive terminal arrangement required.
Unrestricted directory number assignments.
Full flexibility in relocating lines with single wire control.
100 per cent automatic intercept.
Automatic reverting call identification by directory number.
Modular design layout.

Fig. 2 shows a simplified trunking diagram of the NX-3 system. A call from a local line seizes the line finder control which is individual for the 90-line group. While identifying the calling line, the control selects an idle subscriber originating trunk (SOT) associated with an idle originating register (Reg-O). The control sets the line finder crossbar switch by operating two horizontals and a vertical associated with the selected SOT and with access to the calling line.

Upon seizure the Reg-O sends dial tone to the line. By analyzing the first three digits (the office code) the Reg-O determines whether the office code represents the local office or not, North states. Recognizing the local office code, the register stores the remaining digits of the directory number.

If the switchboard is arranged for terminal-per-station the number group is called in and the stored directory number is extended from the Reg-O for translation into line number and party digit. How this is accomplished North describes as follows.

According to the line number, the proper connecting control as well as the selector control associated with the calling register are seized.

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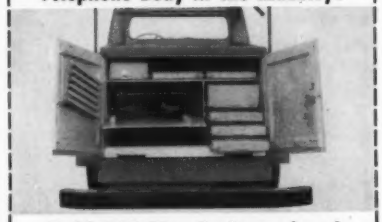

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From the number group and over a link arrangement, the selector control receives the line group number and the connector control receives line number and party digit. The selector is operated to an idle subscribers terminating trunk (STT) belonging to the line group to which the called line is connected.

The connector control operates the connector switch setting a vertical associated with the selected STT in connection with the wanted line. The connection between the calling and the called line is completed by the operation of the SOT. This results in the release of Reg-O, number group and the controls for the selector and connector stages.

A local-to-local call in a terminal-per-line office is handled similar to what has been described for terminal-per-station except for the translation of the directory number. As the directory number in the TPL case is identical to the line number and party digit, selector and connector are seized by the Reg-O as soon as the last digit of the dialled number has been received. The procedure from there on is identical with that of the TPS.

If the register from the first dialled digits recognizes that the destination of the call is beyond the local office, the selector control is immediately seized. According to the route information from the register, the selector is set to an idle trunk. Upon switching of the calling line direct to the trunk, the Reg-O is disconnected and remaining digits sent to the distant office under direct control of the subscribers dial.

Should the first dialled digits be a nonexisting code or for some other rea-

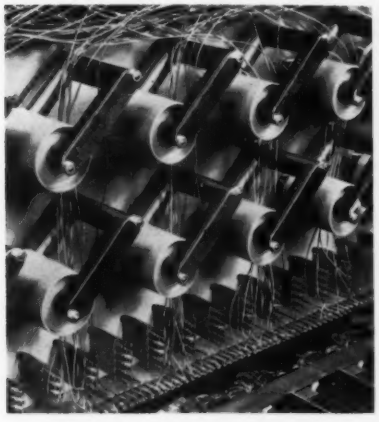

Fig. 3. Close-up of new Trans-O-ring number group showing ferrite rings through which jumper wires are threaded for selection of party terminal. Only one wire has to be moved to relocate a directory number.

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son restricted, the call is routed to manual or automatic intercept.

Incoming trunks have access to a group of incoming registers (Reg-I) via the trunk register link (TRL). The connection of an incoming trunk to a Reg-I is prepared ahead of time to avoid the loss of pulses should the first digit arrive short upon seizure. The procedure in terminating a call locally or to another trunk is hereafter similar to what has been described for calls originating in the line finder.

The number group is arranged for 1000 directory number terminals. The translation from directory number into line number and party digit is accomplished by the use of ferrite core rings arranged in a jumper wire field. There are cores representing line group, tens, units and party digits. *Fig. 3* shows a part of this arrangement.

The assignment of a directory number to a connector terminal is made by connecting a jumper wire to a directory number terminal and passing it through the rings representing line number and party. The wire is terminated on a common terminal block.

At the sending of a pulse through the wire an electronic reading device will respond and feed the required line and party information to the switching circuits.

A station can easily be relocated to another line or be directed to manual intercept by moving the single jumper wire. A complete removal of the wire

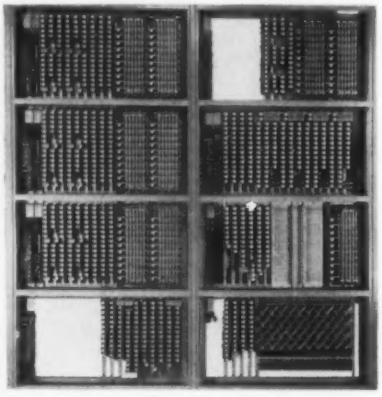

Fig. 4. Layout for typical 90-line crossbar system showing standard module build-up. Bay at left contains three line unit modules (each unit includes line finder and connector crossbar switches), and one control unit module for the three line units. Second bay includes: selector module, originating register group module, number group module, and new Trans-O-ring number group module. Not shown are modules for incoming register group and custom trunk unit (for intra-office repeaters) since these two are built to customer specifications.

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After two years of hard work by our chemists, this product has been perfected. It will remove all stains from the new plastic telephones . . . does not affect the cases in any way . . . is non-caustic, non-corrosive and non-inflammable . . . will not injure hands using it . . . makes cases look like new

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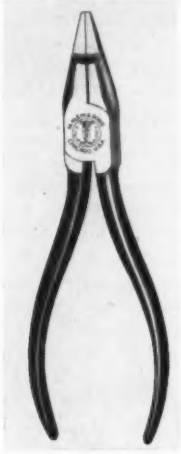
will direct the call to automatic intercept.

For mounting of relays and crossbar switches, a method has been used making it possible to compose standardized units or modules. *Fig. 4* shows a photo of a set of the modules. Crossbar switches and relay bars are mounted vertically in a frame 24⅝ inches by 46 inches wide which also contains the fuse panel and equipment for test access. The modules are factory-wired and tested to the cross-connect terminal block, accessible both from front and rear.

A switchboard is composed of only a few types of standard and custom trunk modular units mounted in bays 8 feet 4 inches high by 8¾ inches deep. A bay of this height contains four modules. Depending on required limits of height and floor space the bay can be made to accommodate three to five modules. Request NP1198.

•

LONG NOSE INSULATION SKINNER—Mathias Klein & Sons announce the addition of a special plier (Catalog No. 2291) for telephone or electronic use.



It will skin 22 or 24-gauge wire. Insulation is cracked in the slot provided in the nose, and length is 6 inches. Request NP1199.

•

LIGHT-WEIGHT KATHANODE STATIONARY BATTERIES—The Industrial Division of Gould-National Batteries, Inc., has introduced a new line of lightweight, space-saving stationary batteries for telephone, switchgear, alarm system, control, signaling, emergency light and other applications where batteries are used as standby emergency power.

The new batteries are available over a wide capacity range—from 50 to 1140

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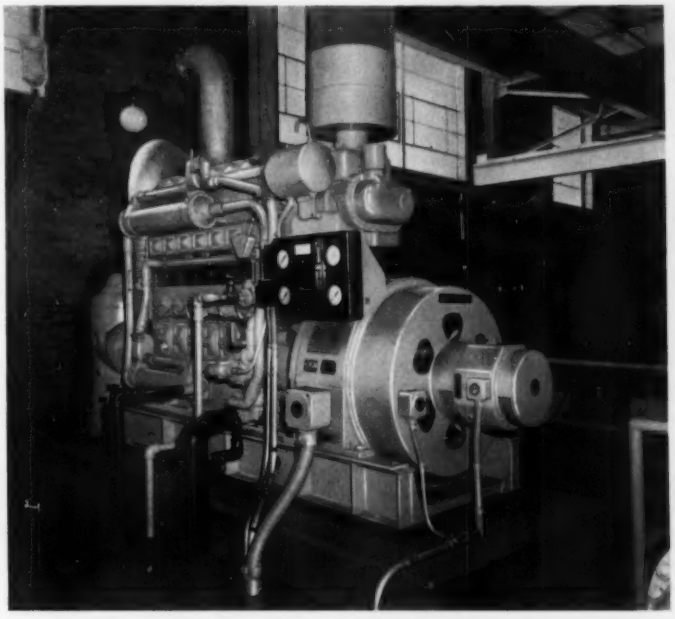
Ohio pumping station saves $300 a month using **F-M** Opposed-Piston standby diesel for both power generation and pumping



Compact, lightweight Model 38F5¼ O-P is rated 450 hp. at 1200 rpm., direct drives a 175-kw. F-M alternator and, through right-angle gears, an F-M Pomona Vertical Turbine Pump with 5.5 mgd. capacity at discharge pressure of 105 psi.

Electric power off the flywheel end, high-service pumping off the front—that's the standby job cut out for this Model 38F5¼ Fairbanks-Morse O-P Diesel in the Elyria, Ohio water works serving 60,000 people.

Called into service for 3 to 6 hours a day in the Spring of 1958, the O-P pumped water for $1.50 less per million gallons than purchased power—a $300 per month reduction, including savings on demand charges. Each Saturday the engine makes a test run as the sole high-service on the line.

Versatile as well as economical, the Model 38F5¼ O-P is also ideal for direct-driving other equipment off the rear, with front end of shaft driving an auxiliary generator, crusher, pump, etc. The O-P can be furnished for either diesel, dual-fuel, or spark-ignited operation, and is available as a complete packaged unit with all accessories attached to the frame. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

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SPECIFICATIONS

1. Power — Model AENL Wisconsin engine.
2. Shipping Weight — 750 lbs.
3. Frame — Rigidly Welded ¼" steel plate.
4. Tires — 4x8 Pneumatic, traction type.
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   3 inches wide up to 5½ feet deep.
   4 inches wide up to 3½ feet deep.
   6 inches wide up to 2½ feet deep.
   (Obtained by different length booms and boom control).
8. Self-Propelled — Drives on all four wheels while digging, rear wheels while in transport gear.
9. Hydraulically Controlled Digging Boom.

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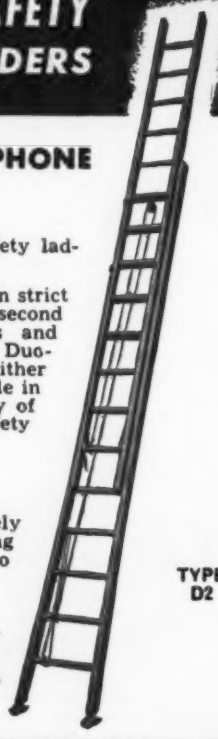

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For Information, Contact Your Supply House, or

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ampere hours. In other words, Gould-National says the new line of Kathanode batteries is designed for full float service.

A rugged Plastrite jar, lighter in weight than conventional containers, the company explains, saves 30 to 40 per cent floor space, permits increased battery room capacity and reduces storage rack requirements. It is said to be easier to handle because of reduced overall weight, and the high impact-resistant plastic container will not bulge or warp under heat.

This battery has several construction improvements incorporating improved electrical characteristics, long life and dependable performance under rugged service, Gould-National reports.

A new leak-proof post seal utilizes a soft rubber o-ring in compression to seal the post against any possible seepage. This acid-proof seal eliminates corrosion and wet covers, the company states.

Breakage of the plastic cover due to the weight of the battery elements is eliminated, according to the company, with an integral molded ledge on each end of the jars that supports all the element weight. The elements are prevented from shifting, even though a cell may be accidentally inverted, since the U-shaped plastic support is bonded to the jar edge.

New terminal posts have a high ratio of contact of posts to the connector, assuring full current-carrying capacity with maximum voltage from cell to cell. All posts have bolt holes in both directions that permit assembling cells end-to-end or side-by-side. Request NP1200.

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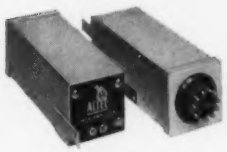
The advanced design of ALTEC telephone equipment makes it ideal for modern telephone systems. In addition to its reliability and high standard of performance, ALTEC equipment requires a minimum amount of space. Inherent flexibility makes it useful in a wide range of applications. Easy maintenance is designed in to save time and money in servicing.



447A TRANSISTOR AMPLIFIER
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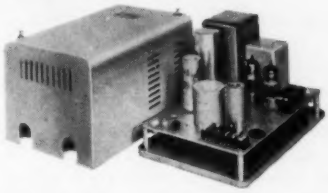
Directly interchangeable with vacuum tube repeaters; dimensions are identical. Requires only 24 - 48 volts. Eliminates need for 130v supply.

SPECIFICATIONS:
Type: Repeater Amplifier (transistorized) • Gain: 37 db from and into 600 ohm loads • Power Output: +18 dbm (at +10 dbm distortion is 1.5%, 300-3000 cps) • Frequency Response: −1 db at 200 and 5000 cps referred to 1000 cps • Input Impedance: 600 ohms • Output Impedance: 600 ohms • Output Noise Level: −70 dbm • Controls: Input volume control which varies gain from −2 db to maximum gain • Power Required: 17 - 24 v (50 ma @ 20 volts) • Transistors: 1 — 2N191, 1 — 2N188A • Dimensions: 1¾" x 1¾" x 6" • Color: Cadmium plate with dichromate finish • Weight: 14 oz. • Mounting: 11 pin Amphenol 86 CPN plug • Monitor Tap: Auxiliary output winding 11 db below 600 ohm winding available at test jacks on front panel and at connector pins at rear of unit • Accessories: Panel for rack mounting 10 repeaters; Rack mounting power supply capable of energizing 100 repeaters; Equalizer; Panel for mounting up to 10 equalizers; Assembly for mounting a 447A in 105B apparatus box.

444B AMPLIFIER
COMPRESSION TYPE

Compression, attack and recovery times are fixed quantities providing optimum performance for message use.



SPECIFICATIONS:
Type: Compressor Amplifier • Gain: 600 ohm input: 70 db • Bridging input: 57 db bridging 600 ohm line • Maximum Compression: 35 db change in input results in 15 db change in output • Power Output: 34 dbm at 30 db compression; 35 dbm with rectifier tube removed • Frequency Response: −2 db at 100 and 3000 cps relative to 1000 cps; More than 10 db down at 10,000 cps • Input Impedance: 600 ohms balanced and 12,000 ohms balanced for bridging • Source Impedance: 600 ohms • Load Impedance: 4 and 600 ohms • Noise Level: 80 db below rated output; −115 dbm equivalent input noise • Power Supply: 117 volts, 60 cps, 30 watts • Tubes: 1 — 6BC8, 1 — 6AL5, 2 — 12BY7A • Dimensions: 9" x 6" x 5" • Weight: 7½ lbs. • Attack Time: 50 milliseconds • Recovery Time: 1 second for 63% recovery • Harmonic Distortion: At 33 dbm output, less than 5%, 200 - 4000 cps; At 30 dbm output, less than 2%, 200 - 4000 cps.

S-17B PROGRAM
AMPLIFIER SYSTEM

Cabinet houses two program-quality 437B amplifiers capable of multiple tandem operation, two 17224 equalizers, and two jack fields to facilitate testing, equalizing, and monitoring. Each amplifier contains its own AC power supply and mounts in the cabinet independently on a plug-in basis for easy replacement and centralized maintenance.

SPECIFICATIONS:
Output Power: +24 dbm • Distortion: not over ½% THD (30 - 15,000 CPS at +24 dbm) • Gain: at least 44 db; adjustable to minimum of 8 db • Gain adjustment: 2 db steps and 1½ db vernier • Frequency response: ±1 db, 20 - 20,000 cps • Equiv. input noise: −115 dbm • Input impedance (internal): 150/600 ohms ±5% • Output impedance (internal): 150/600 ohms ±5% as measured at output of the bridge • Longitudinal balance of input circuit and output circuit with 600 ohm connection: 55 to 60 db at 40 and 15,000 cps; 70 db at 1000 cps • Tubes: 1 — 12AY7, 2 — 12BY7A • Electrolytic condensers: Sprague 17D or equivalent • Transformer insulation: 1500 volt insulation between primary and secondary windings • Impendance change simply accomplished by reversing the impedance plug. Occupies 9⅜" of 19" rack space.

For complete information about ALTEC telephone and paging equipment write to address below or call PRospect 4-2900.

Famous for Quality and Dependability

ALTEC LANSING CORPORATION
1515 S. Manchester Ave., Anaheim, Calif.
A subsidiary of Ling-Electronics, Inc.

12-59

Support aerial cables with

CF&I Galvanized Steel Strand

The giant steelman reflects CF&I's policy of making only quality steel products for all industries. One of them — CF&I Galvanized Steel Strand — is highly recommended for long-lasting messengers to support aerial telephone cables.

CF&I Strand is flexible and provides positive resistance to corrosion and abrasion.

Made in accordance with ASTM Specification A-122, CF&I Galvanized Steel Strand for guy or messenger wires can also be supplied to individual specifications in seven- or three-wire constructions. For Overhead Ground-Wire, CF&I supplies strand made to ASTM Specification A-363. For quick delivery call the nearby CF&I sales office or see your local electrical distributor.

7088

GALVANIZED STEEL STRAND
THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION** — Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N.M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

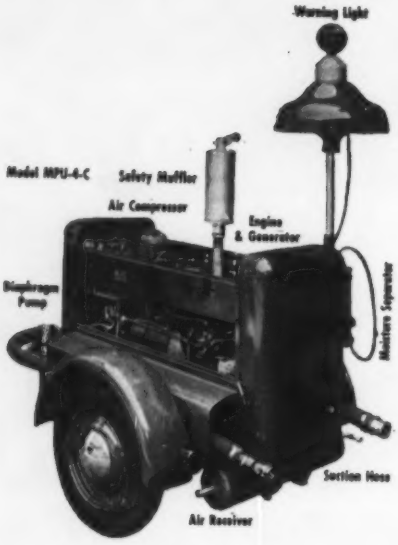
In the East: **WICKWIRE SPENCER STEEL DIVISION** — Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia • **CF&I OFFICE IN CANADA:** Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

YOU CAN HAVE

S&G

A POWER AND PUMPING PLANT

THAT GOES ANYWHERE



MOBILE POWER UNIT

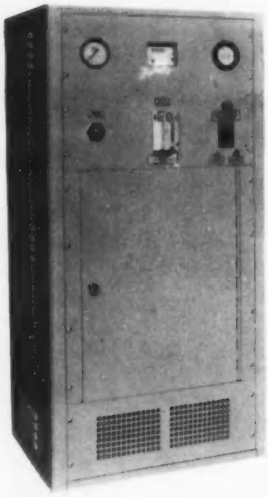
- Generator slow speed for quietness
- Pump—Diaphragm type to remove seepage and drain back
- Air Compressor — to put cables under pressure for cutovers or repairs

  Furnished with or without pump and compressor
- 300-Watt floodlight illuminates working area
- operates soldering pot and iron, electric and air tools
- electric blower to ventilate manhole
- supplies dry air for cable cutovers, flash testing, etc.
- diaphragm pump can be operated from manhole by push button control
- buzzer signal for summoning helper
- light, easy to handle

MODEL A Air Compressor Dehydrator

Exchange equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 30 cables. The unit is equipped with volume recording air meter, high and low pressure alarm switches, humidstat and hour meter.

- Completely automatic in operation
- Air Purifier to eliminate oil mist
- Incorporates the latest safety devices



write or phone

S & G MANUFACTURING CORPORATION

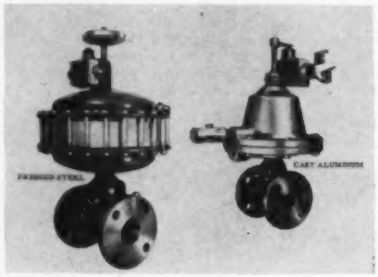
P. O. Box 1309 • New Orleans 10, La. • JAckson 5-3142

George W. Dahl Co., Inc., announces a new air-loaded springless operator for application on many of their miniature valves.

The operator employs a large volume air chamber on one side of the operator diaphragm. This chamber is pneumatically loaded at any desired pressure and sealed by a check valve.

Signal air admitted in the conventional manner to the other side of the diaphragm forces the diaphragm into the air chamber when the signal exceeds the chamber pre-loading pressure.

Compression of the trapped air in the chamber side of the diaphragm returns the operator to normal position when signal pressure drops.



The new Dahl springless valve operator can be furnished in normally closed or normally open models in pressed steel or cast aluminum operator cases. All models have travel indicators and can be easily equipped with microswitches as in the accompanying photo.

The pressed steel and cast aluminum operators are illustrated on Saunders patent valves. Request NP1201.

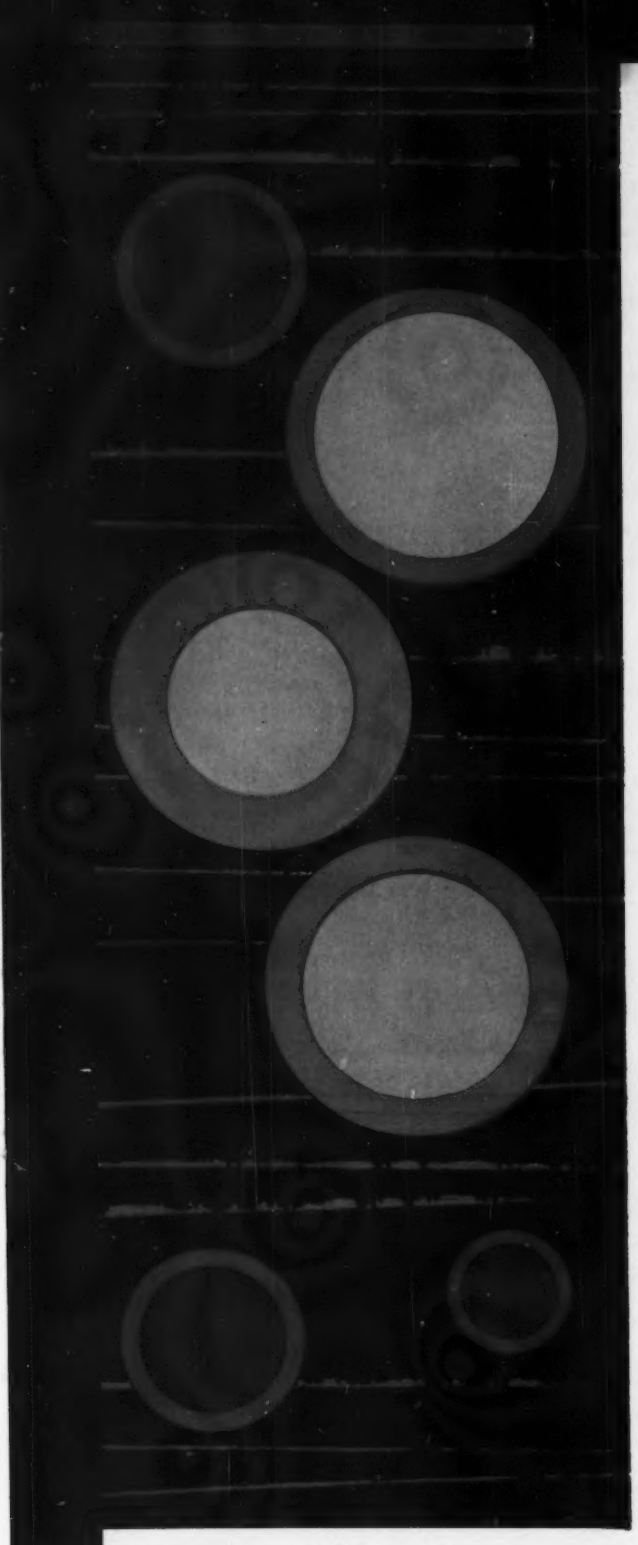
•

TRENCHING TOOL—A new trenching tool, called TrenchSaw, is being introduced by the Auburn Machine Works, Inc.

The TrenchSaw is designed to cut rapidly a narrow trench approximately one inch in width to variable shallow depths, as required for the laying of tubing, conduit, and small pipe for telephone, gas, electrical, and water service.

Because of the small amount of dirt removed from the narrow trench, it is easily back filled with an ordinary garden rake, without unnecessary damage to lawns and garden areas. In many cases the trench can be closed by pressing the edges of the sod together over the trench so that the cut becomes practically invisible, the company reports.

The TrenchSaw is powered by a portable high-speed, two-cycle chain saw engine which can be easily detached and used for a chain saw. The digging chain, with specially designed digging bits, is

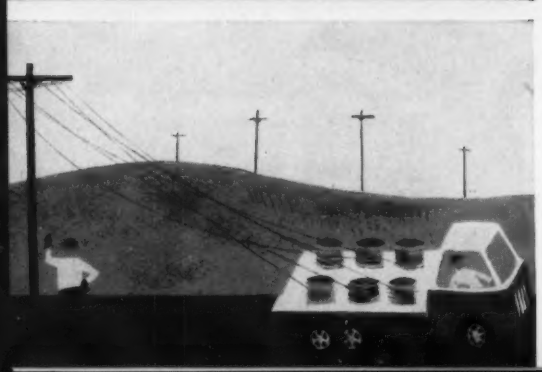


When you specify *standard* **COPPERPLY®** (30% or 40% conductivity copper coated steel wire) for telephone wire or for rural distribution wire, you get the unique National-Standard advantages of precise concentricity and optimum uniformity with maximum corrosion protection.

But . . . if wire exposure doesn't call for the corrosion protection of 6 to 8 mils of copper—which is often true in heavier wire sizes—then you can get additional savings with *tailored* **COPPERPLY.** The enlarged cross sections illustrated at the left show examples of tailored coatings that can be produced by National-Standard's exclusive electroplating process to meet specific requirements. With *tailored* **COPPERPLY** you save even more because *you don't pay for excess copper.*

COPPERPLY has proved itself with contractors and telephone companies in over 50 installations across the country because it resists kinks, strings easily, provides long service life and accommodates future carrier circuits without additional line work.

COPPERPLY is available in continuous non-welded lengths up to 1000 pounds (high strength and extra-high strength grades) in all standard sizes from No. 3 to No. 18 AWG. For catalog information write to National-Standard Company, Niles, Michigan.



COPPERPLY
NATIONAL-STANDARD

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; tire wire, stainless, music spring and plated wires • WORCESTER WIRE WORKS Worcester, Mass.; high and low carbon specialty wires • WARNER LITHO MACHINERY, Secaucus, N. J.; metal decorating equipment • ATHENIA STEEL, Clifton, N. J.; flat, high-carbon spring steels • REYNOLDS WIRE, Dixon, Ill.; industrial wire cloth • CROSS PERFORATED METALS, Carbondale, Pa.; decorative, commercial, and industrial perforated metals.

driven from the chain saw engine through a step-down drive to obtain the proper speed for trenching. The boom is adjustable to obtain the desired depths. A deflector shield piles the dirt to one side of the trench.

Complete with engine, the TrenchSaw weighs less than 70 pounds and, it is said, can easily be handled by one man. A cast roller lets it ride easily over the terrain.

Auburn Machine Works state they pioneered the trenching attachment field with the Jeep-a-Trench Gear-Draulic and the Auburn Gear-Draulic Trencher for various industrial type tractors. While the TrenchSaw, because of its small size, is a departure from their normal production, the company states that they have embodied in the TrenchSaw many of the time-tested features that have been used in their larger units.

Company officials stated that the TrenchSaw was developed because of numerous requests for a small, low cost, simplified trencher that would cut narrow and shallow trenches for underground electrical and telephone lines and for gas light installations. Request NP1202.

•

SHOE-SCRUBBING DOOR MAT—The Progressive Engineering Co. announces its new "Miracle Mat" that automatically wipes shoes clean. Said to cut floor cleaning and other maintenance costs 40 per cent or more, the mat is designed for daily use in industrial and office buildings, for stores, and other locations where heavy foot traffic makes for unwanted dirt inside.

Described by Progressive as easy to install and built for years of trouble-free service, the mat is actually a heavy aluminum grille, rubber mounted in a welded steel frame, and may be installed in any type of floor—wood, concrete, stone, or tile. The floor opening required for the installation measures 37⅞ inches square.

At the pressure of a footstep on the mat, the grille depresses, and a concealed ¼ HP, 110-volt, 60-cycle motor

activates the tough-bristle nylon brushes which run the full length of the mat, and just below its slats. These brushes sweep upward through the grille openings, which measure 3/16 inch by 1½ inches, and are spaced at 5/16-inch intervals. The brushes move back and forth, at hundreds of strokes per minute, scrubbing shoe soles and heels until the pedestrian steps off the mat.

Dirt collected from the foot traffic falls into a catch pan beneath the mat so that dust or slush has no chance to get past the mat, the company says. Disposal of dirt is through the dust-collection system, or by flushing directly into building drains.

This newest addition to the Progressive line of mechanical mats comes in three sizes designed for commercial and industrial buildings.

In addition to its use as a mat, the grille unit is described as adaptable for use as a warm-air register, cold air return, or as a treadle for an automatic door opener. Request NP1203.

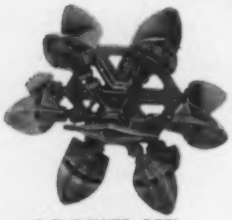
•

LISTENING DEVICE—An electronic device has been developed and patented (patent No. 2,898,405) by George H. Eck of 1655 Woodlawn Ave., Des Plaines, Ill., which can be used as a listening device or two-way speaker in connection with a regular telephone. It is so sensitive that a light trickle of water or a pin dropping can be heard with ease, the inventor states.

It can be used as a listening device only or as a two-way speaker and when used as the latter it can be answered from anywhere in the home.

Mr. Eck states there are many uses

GENERAL MACHINE PRODUCTS COMPANY, INC.
Old Lincoln Highway at Pa. Turnpike, Trevose, Pa.


C-R POWER REEL

SLACK PULLER

CABLE FEEDER

GMPCo

AERIAL TENTS
CABLE BENDERS
CABLE BLOCKS
CABLE LASHERS
COAXIAL CABLE TOOLS
LASHING WIRE
CLAMPS AND GRIPS
PORTABLE & POWER REELS

Distributed by GraybaR ELECTRIC COMPANY

PRESSURE TESTING KIT

COMPOUND

B, C, D, E, & G CABLE LASHERS

Special Purpose Tools To Specifications — Catalog on Request

Over 600 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate shipment

FITS ANYWHERE...

in any business or home

Our new "1553-W" Wall Telephone meets the needs of many commercial subscribers. It's the ideal extension for modern homes . . . perfect as a "first phone," too. Available in 10 new decorator colors . . . 2-step hook switch is built in. Contact your Stromberg-Carlson representative.

STROMBERG-CARLSON

A DIVISION OF **GENERAL DYNAMICS CORPORATION**

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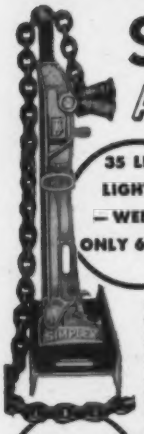
Be Sure of Permanent Protection

NATCO CLAY CONDUIT provides permanent, low cost protection for Underground Telephone Cables. Available in a full line of shapes.

NATCO CORPORATION

327 Fifth Ave., Pittsburgh 22, Pa.

New "Lightweight"
PULLS ANY SIZE POLE EASIER!



Simplex ALUMINUM POLE JACK A-1538

35 LBS. LIGHTER — WEIGHS ONLY 60 LBS.

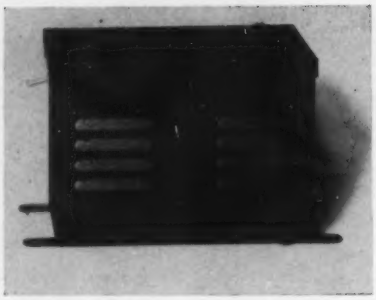
The first time and labor saving improvement in pole jacking in 25 years! Aluminum housing saves 35 lbs. without sacrifice of strength or capacity. Pulls or straightens poles—pulls butts—moves loaded poles...without digging. Husky—to handle the toughest jobs. Same construction features as famous SIMPLEX No. 329 — the standard pole jack of the Bell Systems.

15-TON CAPACITY
22-IN. LIFT

Simplex LEVER · SCREW · HYDRAULIC Jacks

Write for Descriptive Bulletin

TEMPLETON, KENLY & COMPANY



Amplifier. The only unit in system which draws current. Provides for sound amplification. Volume control located in amplifier. Housed in ventilated metal case 9¼ inches long; 6 inches wide, 6½ inches high. Operates on 115 volts, 50-60 cycle, ac only.

for such a device. For example, watchmen can check buildings, schools, factories or homes, by simply dialing their locations and instead of the telephone ringing at the distant end, the listening device is "cut in," which activates the power amplifier and microphone speakers, thereby allowing the calling party to hear the slightest noises or conversations at the called end.

Another use would be to check on baby sitters, small children or bedridden loved ones who, with this device attached to the regular telephone, could be called for two-way conversations from any part of the house without touching the telephone or microphone speaker.

The telephone can be used in the regular manner even though the listening device is attached thereto.

Mr. Eck was connected with the Independent telephone industry for 37 years, serving in many capacities from ground man to president of companies located in Iowa, Indiana, Wisconsin, Illinois and Ohio.

For the past 15 years, he has been in the electronic intercommunication, sound, public address and music business connected with the Executone Co. He is owner of the Executone System Co. of Iowa with offices located in Des Moines, and is still actively connected as a sales engineer with Executone Co. of Chicago. Request NP1204.

Microphone Speaker Station. Housed in metal die-cast cabinet 6 inches wide; 6½ inches high; 3½ inches deep at base. May be table, wall or ceiling-mounted. Also available in flush or surface-wall mount housings.

First All-Color Cut-Over Claimed by N. Y. Company

In the Sept. 5 issue of TELEPHONY, page 42, an item appeared under the head, "Kan. Company Standardizes on Light Gray Telephones." In the item, D. W. Wright, manager of the Reno Telephone Association, Inc., Hutchinson, reported that because of the standardization, there was no additional charge for colored instruments.

Mr. Wright further stated that:

"This may be the first instance of a company installing all color telephones upon cut-over to dial service."

Now, TELEPHONY has received a letter dated Sept. 25 from C. Carney of the State Telephone Co., Coxsackie, N. Y., who, after referring to the item published in the Sept. 5 issue, says in part:

"Our general manager, James A. Warren, wishes to call to your attention that our company cut over our Ravena exchange to dial service in 1950 . . . and cut over our Coxsackie exchange to dial service in 1952, and each time we installed all color telephones.

"We gave our customers a choice of six colors, and there was no charge for the colored instrument.

"I believe we were the first company to install all color telephones."

Dameron New GT&E Employe Publications Head

Doyle J. Dameron has been appointed employe communications supervisor for General Telephone & Electronics Corp., Marshall K. Taylor, personnel director, announced on Sept. 21.

Formerly employe communications coordinator for General Telephone Co. of California, in his new position Mr. Dameron will coordinate the over-all employe communications activity throughout the GT&E organization, including the telephone and manufacturing subsidiaries.

Previously employed by North American Aviation in Los Angeles, Mr. Dameron joined General of California

MOST PROFITABLE...

most handsome...most convenient...

Our new "1576-W" 3-line instrument is **priced right** to serve an **untapped market** for multi-line service: subscribers who need more than one line but don't need a hold feature. Contact your Stromberg-Carlson representative.

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Easy to operate
Single dial balancing
Completely illustrated manual
Portable

SHORTS	Accuracy of Three Measurement
GROUNDS	Varley Method
CROSSES	Only two measurements required
HIGH RESISTANCE FAULTS	Simplified procedure for mixed gauges and loaded Cables
OPEN CONDUCTORS	Improved accuracy over Murray Loop Method
OPEN PAIRS	Self-contained transistorized tone generator
SPLIT PAIRS	Self-contained tuned amplifier-detector

WB WHITNEY BLAKE CO.
NEW HAVEN 14, CONNECTICUT
TELEPHONE Chestnut 8-2515 TWX: NH184

D. J. DAMERON

in 1956. He worked in the commercial and traffic departments before becoming editor of *California General News* in 1957. The following year he was appointed employe communications coordinator.

A graduate of the University of Minnesota with a Bachelor of Arts degree in Journalism, Mr. Dameron has had experience in the newspaper, advertising, and radio fields.

C & D Batteries Sold to The Electric Autolite Co.

Entrance of The Electric Autolite Co. into the industrial battery market was made on Sept. 30 with the purchase of the assets of C & D Batteries, Inc., Conshohocken, Pa. Announcement of the transaction was made jointly by Robert H. Davies, president of Auto-

Wisconsin Gov. Gaylord A. Nelson, at whose request an emergency party line use bill was introduced, is shown signing it into law as F. H. Schafer of Clintonville, president of the Wisconsin Telephone Association looks on. Research on the measure was done by the association in cooperation with the Public Service Commission. It was passed without opposition.

REVENUE BUILDER...

designed for small businesses

This new "1573-W" Telephone* by Stromberg-Carlson is the only **modern** instrument offering your commercial subscribers 3 trunk lines with **Hold** feature on **each line.** A great revenue builder.

Contact your Stromberg-Carlson representative.

**Optional Plunger Kit with Hold button.*

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new

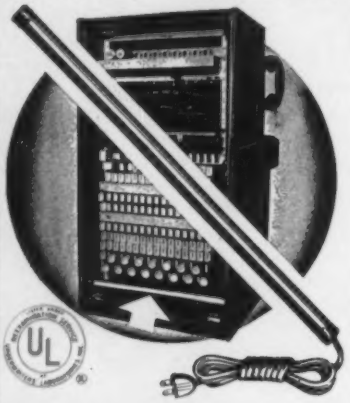
Stops

Leakage and Corrosion

The safe low 150°F surface temperature ...®

DAMPP-CHASER

DEHUMIDIFYING HEATER



- For all PBX
- Unattended CDO's
- Central Office Equipment

Maintenance free. The lifetime heating element is sealed in a 3/4" aluminum tube. Inexpensive, standard, 1-1½-2 & 3 foot lengths for equipment wide efficient heat distribution. Safe to place anywhere! Half the operating cost of old fashoned, inefficient, dangerous "hot spot resistor heaters."

NO Chemicals Replacements Worry

NO Fire Hazard Personnel Hazard Equipment Damage

No assembly, comes complete with clips. Simply plug in and forget, never needs attention. Immediate delivery! Field tested and proved by one of the South's largest telephone companies.

5 YEAR WRITTEN GUARANTEE

Phone: OX. 3-8271 or write for prices and full particulars.

MANUFACTURED FOR OVER A DECADE BY

DAMPP-CHASER, INC.

HENDERSONVILLE, NORTH CAROLINA

Affiliate: DAMPP-CHASER, LTD, London, England

lite, and John F. Rittenhouse, president of C & D.

C & D stockholders' approval to the sale was given at a special meeting held on Sept. 28.

C & D, a 50-year old Pennsylvania firm, has headquarters and a plant at Conshohocken and branch plants at Attica, Ind., and Pennsburg, Pa. The company manufactures and distributes nationally a complete line of industrial storage batteries for use in telephone exchanges, electric fork lift and platform trucks, electric power plants, railroad locomotives and passenger cars, and mine locomotives.

The firm also maintains research and engineering facilities at its headquarters for the development of improved and special battery types and accessories.

C & D employs 300 people and has annual sales of approximately 8 million dollars.

Autolite, one of the nation's three largest manufacturers of storage batteries, operates plants in the United States, Canada, and in foreign countries. Autolite is a leading producer of cable components, spark plugs, ignition systems, aviation wire, metal fabrications, and electro-mechanical, ceramic, and hydraulic devices.

It was also announced that no changes in personnel, management, or field representation of the C & D organization are contemplated. The new operation will become the C & D Batteries Division, of The Electric Autolite Co.

Mr. Rittenhouse and Henry E. Jensen, presently C & D Vice President, have been elected vice presidents of Autolite. Mr. Rittenhouse will be general manager of the new division and Mr. Jensen, head of its engineering and marketing.

H. L. Gerrish Joins Staff Of Leffler Engineers

Harold L. Gerrish after 30 years service on the staff of the Maine Public Utilities Commission, on October 1 became associated with the consulting engineering firm of William S. Leffler Engineers Associated, of Darien, Conn.

Mr. Gerrish will specialize in utility valuation and be in charge of the company's work in the communications field covering regulation. He will be concerned with problems arising about rates, services and practices in connection with inventories and appraisals of telephone companies and related analyses of operating methods and studies requiring "separations anal-

Convention Calendar

1959

Association	*Date*	*City*	*Hotel*
South Carolina	Oct. 25, 26 and 27	Clemson	Clemson House
Virginia	Oct. 29 and 30	Roanoke	Roanoke
Alabama	Nov. 9 and 10	Birmingham	Thomas Jefferson
Georgia	Nov. 11 and 12	Atlanta	Dinkler-Plaza
Oklahoma	Nov. 18 and 19	Oklahoma City	Skirvin
South Dakota	Nov. 18 and 19	Huron	Marvin-Hughitt
Florida	Nov. 30 and Dec. 1	Jacksonville	Robert Meyer

1960

Minnesota	Feb. 7, 8, 9 and 10	St. Paul	St. Paul
Louisiana	Feb. 24 and 25	New Orleans	Jung
Kentucky	Mar. 1	Lexington	Phoenix
Texas	Mar. 7 and 8	Dallas	Baker
Ohio	Mar. 28, 29, and 30.	Columbus	Deshler Hilton
Iowa	Apr. 5 and 6	Des Moines	Ft. Des Moines
Nebraska	Apr. 19 and 20	Omaha	Unannounced
Indiana	May 4 and 5	Indianapolis	Claypool
Illinois	May 19 and 20	Springfield	Abraham Lincoln
Kansas-Missouri*	May 23 and 24	Kansas City	Town House
Pennsylvania	June 6 and 7	Bedford Springs	Bedford Springs
California	June 8, 9 and 10	San Francisco	Fairmont
Washington-Oregon*	June 16 and 17	Portland	Sheraton Portland
New York	June 20, 21 and 22	Schroon Lake	Scaroon Manor

*Joint Convention

GET EXTRA REVENUE...

from new decorator colors

Extensions are easy to sell when you offer your subscribers Stromberg-Carlson telephones in a selection of 12 exciting new decorator colors. Available in desk or wall models.

Contact your Stromberg-Carlson representative.

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LOW-COST
WITH
RELIABILITY

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TRUNK
PAYSTATION
CARRIER

POINT-TO-POINT
MULTIPLEXED
RADIO SYSTEMS

VISIT ROOM
656A
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OCT. 11-14th

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AND
MICROWAVE

BUDELMAN
bec

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1123 SLOCUM STREET, DALLAS 7, TEXAS

TELEPHONE ELECTRONICS
P.O. BOX 571, STOCKTON, CALIFORNIA

THE ENGINEERING SERVICE
P.O. BOX 178, BUTTE, MONTANA

EXPORT

TELE-RADIO SYSTEMS LTD.
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H. L. GERRISH

yses" for the determination of cost-to-serve.

After receiving his B.S. in electrical engineering from the University of Maine in 1925, Mr. Gerrish entered the service of the Milo Electric Light & Power Co., first as engineer, then as supervisor of construction, then as manager in 1927.

When the company was purchased by the Maine Public Service Co. in 1928, Mr. Gerrish joined the engineering staff of the Maine Public Service Commission, where until 1938 he served as utilities engineer, and for the next 20 years was in charge of the electric and telephone division.

Mr. Gerrish has continuously participated as a member of the National Association of Railroad & Public Utility Commissioners' special telephone committee, since its origin in 1947, in their continuous study of Bell Telephone System state and interstate rates and Western Electric's rates. He also served on the toll rate, and the separations & toll rate disparity subcommittees.

He authored the section on telephone rate design and has made notable contributions to the committees responsible for the development of the first Separations Manual and on each subsequent modification of it.

He has participated in every New England Telephone & Telegraph Co. rate case since 1947 as a witness for the state on separations and rates. Also, his services have frequently been loaned as a consultant on separations and other cost studies to New Hampshire, Massachusetts, Vermont, and Idaho.

Mr. Gerrish has been a member of the NARUC committee on engineering, from its inception in 1946, in the development of service standards and cost allocation methods. He served as chairman of the committee on procurement and training of commission engineers and staff personnel.

During the past summer, Mr. Gerrish was selected by Georgia Tech to participate in the graduate training school for NARUC staff members. He conducted the course on rate case preparation, presentation and form.

Fuse Cutouts Manager, Engineer Named by Hubbard

Hubbard & Co., Chicago, has appointed Douglass S. List as product manager to supervise the marketing of their new line of fuse cutouts.

This product line is now being headquartered and manufactured in the company's Melrose Park, Ill., plant.

Mr. List, a 1949 Purdue EE graduate, was formerly with Duncan Electric of Lafayette, Ind., and more recently a manufacturer's agent in the Indiana-Kentucky area.

Appointed as application engineer for

"Quite an achievement," says Chillicothe (O.) Telephone Co. Vice President Robert McKell of the 60-year service record celebrated on Sept. 1 by Miss Grace E. K. Brown. Starting in 1899 with The Home Telephone Co. as operator, Miss Brown rose to secretary, board member and commercial supervisor of its successor; has no intention of retiring to talk about "pills and ills."

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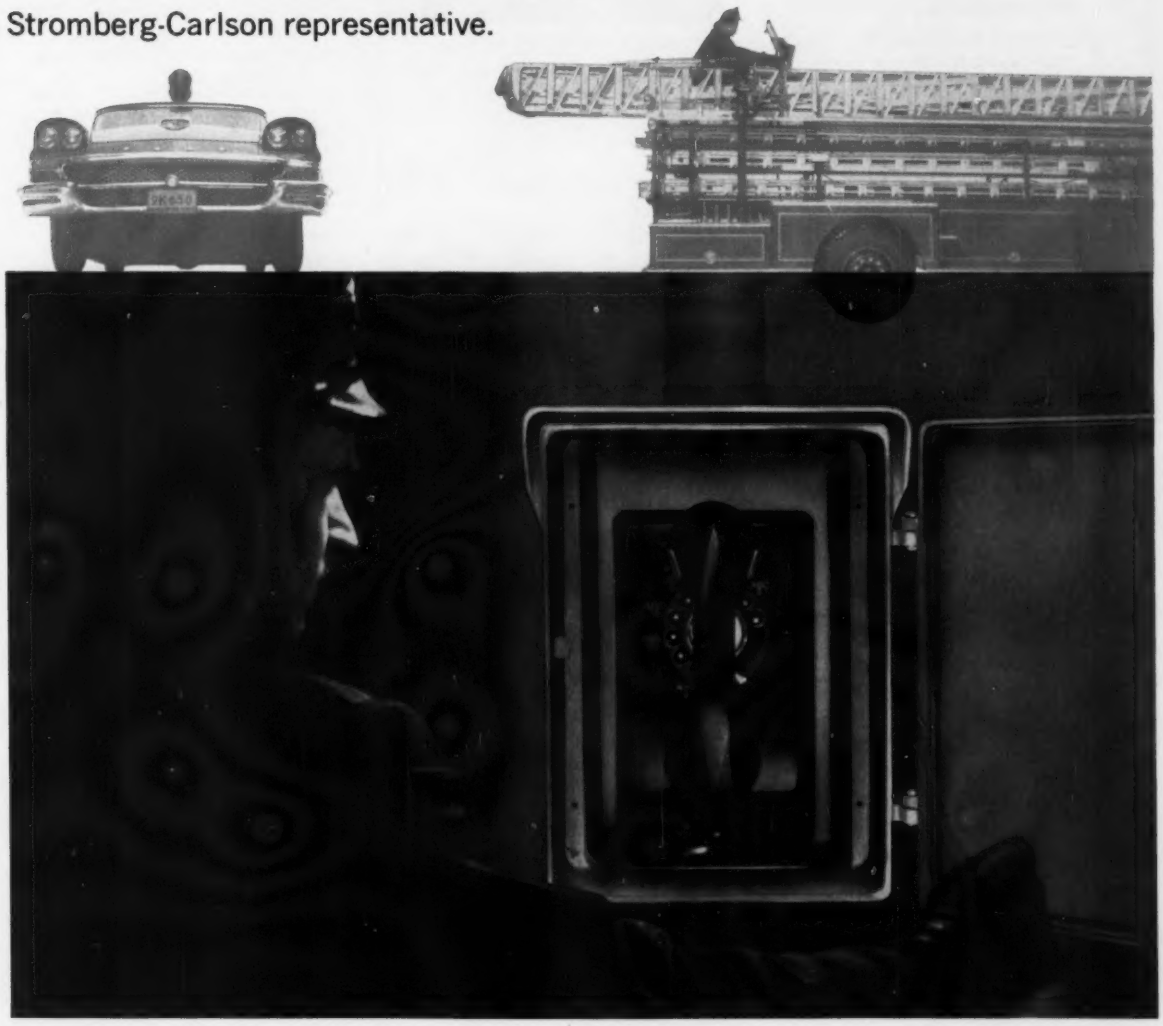

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D. S. LIST

fuse cutouts is D. H. White. Mr. White, a 1947 Cornell graduate, was formerly with the insulator department of the General Electric Co.

Whitney Blake Names Vice President

John Brown Cook, president of The Whitney Blake Co., New Haven, Conn., on Sept. 25 announced the appointment of Robert H. Beisswenger by the directors to the position of vice president and sales manager.

R. H. BEISSWENGER

Mr. Beisswenger joined Whitney Blake in September 1958 as general sales manager from the Indiana Steel & Wire Co., Muncie, Ind., where he was vice president. He has been engaged in the marketing of wire products for the telephone industry for a number of years.

Whitney Blake Co. is a manufacturer of insulated wire and cable for the Independent telephone industry, the government, utilities and industries of all types.

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94G 3.50
94H 5.00
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12 ft. stub..... 7
F-16, 5 1/2 ft. stub..... 10
12 ft. stub..... 12
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BD-102, cross-conn 51 pr. or terminal 102 pr..... 80
BD-404, as above..... 200
BD-606, as above.....250
B-101 (B Box)..... 100
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LC 26, complete..... 60
LC 51, complete..... 80

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G-26, bind post chamb.... 10
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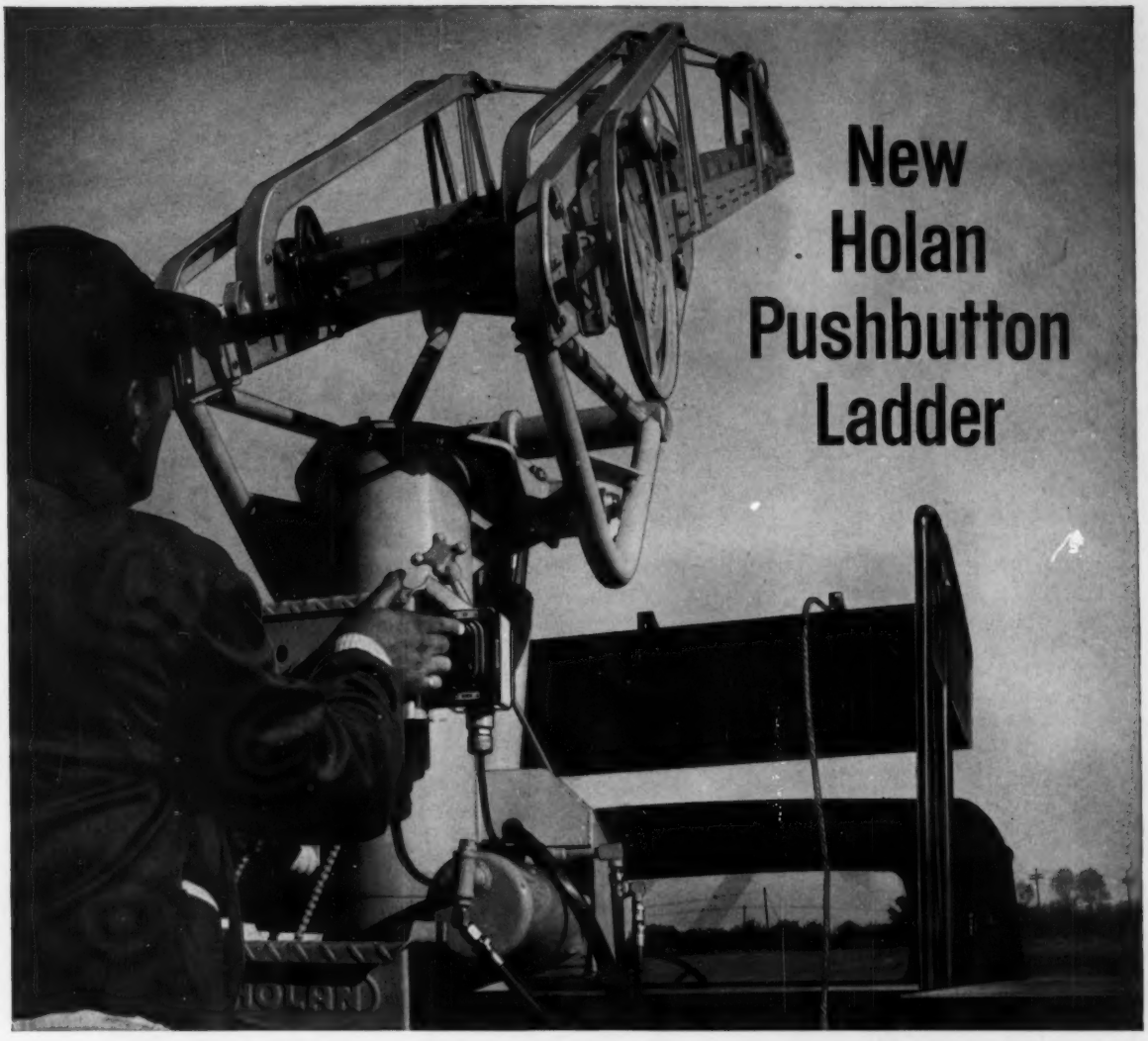

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